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DRAFT ENVIRONMENTAL STATEMENT

VOLUME 2 OF 2

Proposed
1974 OUTER CONTINENTAL SHELF
OIL AND GAS GENERAL LEASE SALE
OFFSHORE LOUISIANA

OCS SALE No.36

DES 74- 49

Prepared by the
BUREAU OF LAND MANAGEMENT

Eust L. Berklund

Director

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IV. ENVIRONMENTAL IMPACTS OF THE PROPOSED SALE

A. Impact on the Living Component of the Environment

An Introduction

OIL SPILLS

The most severe impacts on the communities of the marine and coastal ecosystems of the eastern Gulf of Mexico will be those resulting from spilled oil. It is important at the start, however, to point out that predictions of effects at the community, even population, level have no firm basis in the existing literature. No studies aimed at determining the effect of spilled crude oil at the community level have as yet been accomplished in the Gulf of Mexico. Studies which encompass effects at the community level are unfortunately far removed geographically and not closely related to conditions in the Gulf. These latter studies include the commendable efforts of the scientists at Woods Hole in their study of the spill at West Falmouth, but the material spilled there was No. 2 fuel oil, generally conceded to be far more toxic than most crude oils. Also included are the studies at Santa Barbara and at Milford Haven and Cornwall, England, which addressed various aspects of high energy beaches, natural beach erosion, rocky intertidal zones, large tidal ranges, natural oil seeps, pesticides and large quantities of emulsifiers. Few of the conditions of these studies are exactly duplicated in the Gulf of Mexico.

The larger proportion of studies on oil pollution has been devoted to effects on small biotic groups or individual species, involving either accidental spills, controlled oilings, or laboratory aquarium studies, and the results are applicable at the cellular or organismic level.

Thus, predictions of impact must be based on diverse and mostly unrelated studies, few of which are devoted to the Gulf of Mexico; conclusions, where made, must be regarded as tentative.

In preparation of the Georges Bank Petroleum Study, MIT's Offshore Oil Task Group (1973) 1/ identified several pathways by which crude oils can exert a damaging effect on plants and animals.

- a) any disruption at or below cellular level is considered to be cellular effect;
- b) any disruption above the cellular level dealing with biochemical processes is considered to be physiological effect;
- c) any disruption of instinctive and/or voluntary control is considered to be a behavioral effect.

They then defined five responses which are elicited by these three types of effects:

1/ The Georges Bank Petroleum Study. Offshore Oil Task Group, Massachusetts Institute of Technology. Sea Grant Project Office, Report No. MITSG 73-5, 1 Feb. 1973.

- (1) lethal toxicity,
- (2) sub-lethal disruption of physiological or behavioral activities,
- (3) the effects of a direct coating by oil,
- (4) incorporation of hydrocarbons in organisms which cause tainting and/or accumulation of hydrocarbons in food chains, and
- (5) changes in biological habitats.

We have taken these responses and applied them to three broad categories of spills and the ecosystems they effect in Table 1.

PIPELINE BURIAL, DRILLING MUD AND CUTTING DISCHARGES

No attempt has even been made to determine the effects of these operations on the marine and coastal ecosystems in the Gulf of Mexico, or, to our knowledge, anywhere in the world. This dearth of information will hopefully be remedied by future studies and the results of several promising current studies.

It can be assumed that the effects of pipeline burial in offshore areas and wetlands will be qualitatively similar to those ascribed to channel dredging, but not as severe because:

- (a) the physical dimensions of the excavation are much smaller

Table 1. Ecosystems Affected by Various Aspects of Oil Spills

Source	Lethal Toxicity	Sublethal Effects	Coating With Weathered Oil	Incorporation of Hydrocarbons into Food Webs	Changes in Habitat
Massive Oil Spill	Open Gulf Shoreline Estuary/ Wetland	Open Gulf Shoreline Estuary/ Wetland	Shoreline Estuary/ Wetland	Open Gulf Shoreline Estuary/ Wetland	Shoreline Estuary/ Wetland
Small Oil Spill	Shoreline Estuary/ Wetland	Shoreline Estuary/ Wetland	Estuary/ Wetland	Estuary/ Wetland	
Chronic Discharges and Minor Spills	Shoreline Estuary/ Wetland	Open Gulf Shoreline Estuary/ Wetland	Shoreline Estuary/ Wetland	Shoreline Estuary/ Wetland	Shoreline Estuary/ Wetland

Explanation of Terms:

Massive Oil Spill: Several hundreds to thousands of barrels

Small Oil Spill: Fifty to a few hundred barrels

Chronic Discharges and Minor Spills: Amounts small but very frequent or continuous

Lethal Toxicity: Interrupts physiological processes at cellular or organ level

Sublethal Effects: Adverse effects on physiology of growth and reproduction and on instinctive and voluntary behavior

Coating with Weathered Oil: Large patches of tarry material which has already lost much of its toxicity due to biochemical oxidation, vaporization

Changes in Habitat: Lasting for several years, longer than the spill/clean-up period.

Shoreline: Intertidal to exposed beach; not including estuaries, bordering wetlands.

b) the digging of a pipeline canal, or burial of a pipeline is a one-time event, whereas channel dredging is more or less continuous.

It is tentatively assumed that the effects of drilling muds and cuttings discharges are also related to those of dredging, specifically, turbidity and smothering. Of further note is the presence of chromium in many marine drilling muds as the organic complex, (ferro)chrome lignosulfonate. Overboard loss or discharge of drilling fluids would introduce some of this chromium into the marine environment. On a weight basis, this element is present in unweighted commercial lignosulfonate drilling mud components at a concentration of about 12 ppt. Required sea water additions to the mud concentrate reduce this value to less than 4 ppt. -- the approximate concentration of chromium in discharged drilling mud. In addition, dilution/dispersion effects associated with overboard discharge into Gulf waters would be considerable.

Although data relating to toxicities of organic compounds containing chromium are scarce, recent work suggests that chrome lignosulfonate, in moderate to strong dilution, is relatively harmless. While readily soluble in sea water, the compound apparently dissociates very little. If inorganic chromate is also present in the drilling mud, however, oxidation of the chrome lignosulfonate occurs, evolving a new organic

chromium complex (Skelly and Dieball, 1970)^{1/} The nature of this new phase is not well understood.

Jessen and Johnson (1963)^{2/} discuss physical adsorption and ion exchange relations between chrome lignosulfonate and clay components of drilling muds. Their work indicates a strong tendency towards adsorption of all chrome species present in the muds tested. Ion exchange occurred predominately in the high-sodium bentonite clay types. Both transfer mechanisms effect the removal of chrome components from the water column with subsequent deposition as clay sediment. Once on the sea floor, chrome lignosulfonate is fairly resistant to biodegradation, however, certain benthic invertebrates are known to concentrate trace amounts of various heavy metals over extended time. The possible role of drilling mud chromium additives in this phenomenon should not be ignored. Recent industry tendencies towards maximum recovery of chemical additives will minimize any potential hazard to life species while relevant experimental data accumulates.

In general the effects of pipeline burial and drilling mud and cutting discharges are:

- a) dredging nearshore areas where land pollution has occurred for many years, numerous pollutants will be resuspended in the water column. These may include organic matter which

^{1/} Skelly, W.G. and D.E. Dieball, 1970. Behavior of chromate in drilling fluids containing chrome lignosulphonate. Soc. Petr. Eng. Jour., 10:140-144.

^{2/} Jessen, F.W. and C.A. Johnson, 1963. The mechanism of adsorption of lignosulfonates on clay suspensions. Soc. Petr. Eng. Jour. 3:267-273.

will increase BOD and decrease dissolved oxygen, toxic heavy metals and pesticides which may exert toxic effects before gradually being reincorporated into the sediments.

- b) dredging in areas of hard bottoms, where biotic communities have evolved to take advantage of such conditions and are adapted for attachment to a hard substrate (sponges, soft and hard corals, seaweeds, sessile molluscs), will eliminate suitable sites for attachment in the path of the operation. These effects will be neither permanent or last until the substrate can become compacted again, a process involving at least several years.
- c) both pipeline burial and mud/cutting discharges will produce a smothering effect on the burrowing and attached benthos where the material gradually settles as a layer of significant thickness.
- d) increased turbidity will occur at all marine sites where pipeline burial and mud/cutting discharges takes place. The fine particles causing the turbidity can clog the respiratory organs and filter-feeding mechanisms of many marine animals.
- e) pipeline burial in coastal wetlands and uplands will displace many species of wildlife during operations due to noise pollution and the physical presence of construction machinery. This disruption will terminate as soon as

construction is completed. The effects of pipeline burial in wetlands can have a substantial impact of one to several years duration through devegetation and disruption of substrate.

OTHER IMPACTS

Still significant, but probably less environmentally damaging impacts result from the discharge of produced formation waters into the sea and onshore habitat removal by pipeline terminals and ancillary facilities.

B. Impact on Biota of the Open Gulf

Impacts in the open Gulf ecosystem will result from accidental loss of debris, discharge of drill cuttings, sand, drilling fluids, the burial of pipelines, and the accidental spillage of oil or other toxic materials. It must be recognized at the outset that oil spills probably represent the most severe threat to biota, but various fractions of crude oil present greater or lesser threats. The natural (chemical, physical, and bacteriological) degradation of crude oil is a complex and not well understood process. Additional complexities such as local concentrations of various hydrocarbon fractions, and the different effects of these concentrations on different species are concomitant with the degradation process. Much of our knowledge of these factors has been obtained through laboratory studies, poor analogs for the natural environment. Available information will be presented in the appropriate sections following.

1. Impact on Pelagic Marine Life

Pelagic marine life includes a broad spectrum of organisms from all trophic levels and includes the phytoplankton, zooplankton, nekton and demersals (shrimp, fish, squid, and marine mammals), and pelagic seabirds.

a. Impact on the Plankton

Impacts that may be anticipated to have an effect on plankton will result from accidental spills of oil (and associated

use of emulsifiers) and other toxic materials, discharge of drilling fluids and formation waters, and burial of pipelines.

After an oil spill has occurred, that which has not evaporated, been carried ashore, or cleaned up will float at the surface for a time and eventually be dispersed as minute droplets in the water. In addition, certain components of crude oil are slightly soluble in seawater. In each of these three phases (floating, droplets, solute) the oil has the opportunity to damage marine organisms and/or enter the marine food web. The organisms most immediately and drastically affected are those which are found in close proximity to the sea surface.

Spooner (1969) notes that plankton collections following Torrey Canyon showed damage to minute plant cells of the order Prasinophyceae which float at the surface. A high proportion of pilchard eggs, which also float, were dead and there was a local shortage of pilchard larvae. She is unsure whether this damage was done by oil alone or by oil and the emulsifiers which had been used to disperse the oil. According to Mironov (1971), cell division in phytoplankton was delayed or inhibited by crude oil concentrations ranging from 0.001 to 1000 ppm.

Hufford (1971) notes laboratory studies which indicate that oil can affect phytoplankton after several days exposure. He cites laboratory experiments in which oil products in sea water inhibit cellular division and cause death in phytoplankton.

Apparently, cellular membranes were damaged by the penetration of hydrocarbons and this led to the extrusion of the cellular contents. During a study of the effects of the Santa Barbara spill, however, Oguri and Kanter (1971) found no conclusive evidence of a decrease in phytoplankton community productivity that could be attributed directly to the oil spill. Individual experiments indicated, however, that the use of dispersants may have resulted in marked reductions in productivity. They theorized that the longevity of any such effect would depend on the currents and rate of dilution, as well as the type and quality of the dispersant. No evidence was found in the literature that spilled oil enters marine food chains via adsorption or absorption by phytoplankton and subsequent ingestion by grazing herbivores.

The floating seaweed Sargassum and its associated community would be damaged by floating oil. In mature states, this seaweed, along with broken blades of seagrasses, can form large floating mats, patches or long windrows. This is a very rich community including

a large aufwuchs (living attached to, or gliding upon) component, and a rich plankton component. In addition, many juveniles of fish, squid, and other nektonic forms are associated with the floating masses (LaRoe, 1972). It is conceivable that oiling of the sargassum would cause it to adhere and form tight mats or clumps and would result in complete destruction of the community.

Little information has been found concerning the effect of crude oil on the zooplankton. Hufford (1971) cites one experiment which showed accelerated death of zooplankton exposed to diesel oil (0.1% for 5 to 60 minutes) as compared to non-exposed zooplankton. Mironov (1971) states that some copepods are sensitive to 1 ppm suspension of fresh or weathered crude oil and diesel fuel. Zooplankton have been observed to ingest spilled Bunker C oil particles, however, with no apparent effect. Members of the Operation Oil Task Force (1970), studying the effects of spilled Bunker C from the tanker Arrow in Chedubucto Bay, Nova Scotia, observed that many copepods in the area had apparently ingested small oil particles and 2.4% Bunker C was found in the feces of one species. They noted that animals containing smaller oil particles voided these within 24 hours and showed no signs of distress. That they continue normal activities apparent harm is quite important to the marine food web, because they can be eaten by small fishes and filter-feeding organisms

while carrying the oil in their guts. The fish and filter-feeders may in turn be eaten by larger predatory animals, establishing the potential for a classic example of biological magnification of a potentially harmful or toxic compound. A similar effect could be expected if other toxic materials such as diesel fuel, solvents, or heat exchanger fluids were spilled during handling or as a result of platform damage.

The preceding discussion includes only the results of massive, infrequent spills. However, statistical evidence exists (see section III.A.) that small spills of fractions of a barrel to 50 barrels occur on the order of a thousand times per year in the Gulf of Mexico. The problem of determining potential impact from chronic, low-level spillage is difficult. Virtually none of the reports which we were able to obtain of scientific investigations on oil spillage, addressed the effects of low-level, continuous spillage in offshore water. It is difficult to assess or predict potential damage to one group of organisms, i.e., plankton, but it seems appropriate to discuss the problem at this point. A few scientists have offered cautious speculation. A more pessimistic view is taken by Blumer (1969) who has stated: "...we are rather ignorant about long-term and low-level effects of crude oil pollution. I fear that these may well be far more serious and long-lasting than the more obvious short-term effects." Blumer (ibid) then points out that hydrocarbons are taken up into the

food chain, and through the process of biological magnification can become concentrated in marine species used by man for food. He states "One consequence will be the incorporation into food of materials which produce an undesirable flavor. A far more serious effect is the potential accumulation in human food of long-term poisons derived from crude oil, for instance of carcinogenic compounds." Blumer also cautions that low-level pollution may damage the marine environment by masking natural chemical sex attractants, interfering with chemical food sensing and enemy repulsion. He states, "There is good reason to believe that pollution interferes with these processes in two ways: by blocking the taste receptors and by mimicking for natural stimuli;..."

A somewhat less pessimistic view is taken by St. Amant (1972). In offshore areas, where chronic spills could result from leaking vessels and plumbing, and discharge of oil-contaminated, produced brine waters, St. Amant views the problem as follows:

"Chronic pollution from offshore production sites represents an unknown factor. Daily drips and loss of small amounts of oil or other chemicals overboard do not appear to generate ecological problems because of the relative immensity of the water column. Whether such sublethal pollution will eventually accumulate and cause environmental degradation is yet to be determined. Because of this unknown factor, significant effort should be made to prevent low-level pollution."

A still less pessimistic view is taken by Oppenheimer. ^{1/} He notes that hydrocarbons have been a part of the natural environment since

^{1/} Oral and written testimony given by Dr. Carl Oppenheimer of Univ. Texas Marine Station at the OCS Public Hearing on a proposed oil and gas lease sale offshore Louisiana. August 23, 1972. New Orleans, Louisiana.

life began. Also, he states that, "...except for the commercial concentrations of oil in our geosphere, no recognizable concentration of specific molecules have persisted in the aquatic environment other than tar balls, as microorganisms are ubiquitous in their role in mineralizations or recycling of the hydrocarbons in natural environments."

Oppenheimer continues:

"There is a priori evidence that hydrocarbons may in some areas be significant as a nutrient source for living organisms. It may not be surprising when one looks at the pathway of hydrocarbon degradation. A first step of degradation is the formation of fatty acids which is a good source of food for marine organisms. It is interesting to note that the fish catch in the oil producing areas of Louisiana has increased materially during the past 30 years. Fishing effort in the Gulf remained somewhat constant over the last 10 years with 10,000 small boats and 3,500 vessels operating... Logic tells us that fish must be present if they are being caught. This fish catch increase is in an area where nearly 3 billion barrels of oil have been produced over the last 30 years. I find that total fish catch, as it represents the top of the food chain, can be a good indicator for the state of the environment."

In his summary, Oppenheimer notes, "...there (is) no conclusive evidence of long-term adverse oil effect on the living populations...."

It is our conclusion, based on past performance (see statistics, section III.B.) that sooner or later a major spill will result if this proposal is implemented. We are certain that thousands of minor spills will occur. As to the effects of a major spill on plankton, and the entire ecosystem as well, we endorse the conclusions of Dr. James I. Jones, Research Coordinator of the Coastal Coordinating Council, Florida Department of Natural Resources. 1/ He stated that:

1/ Letter, through State of Florida, Department of Natural Resources, dated June 22, 1973.

"The catastrophic major oil spill is the single most visible, and therefore to a degree, most controversial of any aspect of petroleum production and transfer. While there is no question that a major spill does indeed cause a massive destruction to both flora and fauna, as well as the environment itself, these effects are of a temporary nature in most respects. The natural recovery capability of a healthy ecosystem is such that the massive mortality and destruction attendant with a major spill will allow a recovery of the ecosystem, with some alteration, within a relatively few years. In those areas where the ecosystem is already stressed, however, as is the case in many areas within the coastal zone, a single catastrophic spill could well create effects that are far beyond the natural recuperative powers of the ecosystem."

We believe that the plankton and other populations of the Louisiana Outer Continental Shelf ecosystem will be able to absorb the impact of a major oil spill and recover fairly rapidly. Our greatest concern is for coastal areas and estuaries, which are discussed later. It is not likely that significant amounts of oil spilled from platforms would reach most coastal areas, because of the distance from shore, prevailing winds and currents, and clean-up operations. The greatest possibility for a coastal and shallow water oiling is from tracts in the South Marsh Island-North Addition, Eugene Island, Ship Shoal, South Pelto, West Delta, South Pass, South Pass-South & East Addition, Main Pass, Main Pass-South & East Addition, and Mobile South No. 2.

The regular discharge of formation waters, "oil field brines", could have a severe local impact on the plankton. It has been conjectured that the brines also could serve as a "fertilizer" in shallow seas which might trigger a red tide.

Although formation water is put through a polishing facility and has all but traces of entrained oil removed, it may contain a heavy con-

centration of dissolved salts 1/ and is devoid of dissolved oxygen. It could be anticipated that the release of this water would result in a plume trailing away from the point of discharge in the direction of the current with a core perhaps a few feet in diameter and tens of feet in length. This plume would probably be harmful or lethal to the plankton. Physiological stress would probably result from an osmotic imbalance (cells losing water to surrounding brine) and low dissolved oxygen. Beyond the zone of stress, however, Mackin (1971) has actually noted a zone of stimulation or fertilization during a study of brine discharge in Galveston Bay.

Red tide outbreaks have occurred in several coastal areas of the Gulf, notably the west coast of Florida and east Texas, but have not been reported in Louisiana waters. Ingle and Martin (1971) have correlated red tide occurrences in Florida with iron compounds of various types and concentrations. Formation waters contain iron in the range of 15 to 153 mg/l, but the amount of iron postulated by Ingle and Martin as necessary to trigger a red tide could not be supplied by oil field brines. If the possibility of red tides exist in Louisiana waters, we do not believe that an occurrence will be caused as a result of this proposed sale and subsequent operations. Further, we do not believe that other constituents of brines could be responsible,

1/ An average of 141,473 mg/l was found in the examination of over 80 examples of formation water taken from South Louisiana and the OCS. This value may be compared to the world average of 35,000 mg/l for natural seawater.

because they are not now known to be limiting factors in red tide blooms.

The remaining impacts suffered by the plankton will be localized, and are all related to increased turbidity. These impacts are brought on by the discharge of drilling fluids and drill cuttings, and the jetting of sediments during underwater pipeline burial. The turbidity conditions resulting from these operations are seen as a visible plume in the direction of local currents and usually disappears within a few yards to a mile from the source. The effect of this turbidity on a given parcel of water is of short duration, lasting on the order of a few hours at the most. The physiological effect is to depress photosynthesis by obstructing the penetration of sunlight. It is our conclusion that the effect of increased turbidity would be immeasurably small at more than a few feet from the point of discharge.

Of particular interest are the planktonic larvae of various benthic invertebrates. These meroplankters (planktonic for part of life cycle) are generally considered to be most sensitive to environmental stress and predation while in the water column. Pelagic larvae are the primary means by which benthic invertebrates distribute themselves over wide geographic areas. Based on the high reproductive potential and numbers of larvae released by these animals, we feel that, while there may be a locally adverse effect, distributional and survival powers will not be significantly affected.

b. Impact on the Nekton

Nekton, by definition, include all marine animals which are active swimmers and are able to migrate freely over considerable distances. This motility, combined with irritation sensing ability and natural escape and avoidance behavior, enable them to avoid localized adverse conditions.

Therefore, the only significant impact on the nekton would be as a result of a massive oil spill.

No information has been found on the effect of spilled oil on members of the nekton other than fish. Hufford (1971) cites several early studies which show that crude and bunker oils harmed or killed fish eggs in laboratory experiments. He also cites Mironov (1970) who found that oil affects fish respiration by clogging gills and damaging gill tissue. At the behavioral level, Nelson-Smith (1971) has stated that fish seem to avoid contaminated areas. While this has survival value for the fish, the contaminated areas then constitute unusable habitat. A more common (and easier) approach to studying the effects of oil on fish is to expose them to various amounts of oil in a laboratory aquarium (e.g., Spears, 1970) but this is not of great value in assessing the impact of spilled oil in the ocean because of the vast difference between an aquarium and the ocean and the fact that oil concentrations in the water during a spill are rarely known. Rice (1973) has noted that in laboratory studies, pink salmon fry are able to detect low, sublethal concentrations (as low as 1.6

mg/l of oil for older fry) of Prudhoe Bay crude and show avoidance behavior to it. He acknowledges that the effects of sublethal concentrations of oil on salmon migrations are unknown, but emphasizes that the potential for harm is clear. Salmon, of course, do not inhabit the Gulf of Mexico, but there are many migratory fish species in the Gulf.

Blumer (1969) has proposed that physiological/behavioral effects may interfere with fish nutrition by:

- a) blocking taste receptors, and
- b) mimicking natural chemical messengers which attract predators to their prey.

Boesch (1973) cites the unpublished work of Todd and Atena (Woods Hole Oceanographic Institution, Chemotaxis Group). They worked with behavior patterns of yellow bullheads, Ictalurus natalis. They found that the fishes complex, chemically-mediated social behavior developed high intensity conflict behavior when exposed to water soluble fractions of Kuwait crude oil.

It is also significant that fish could suffer stress from feeding on contaminated prey such as the oil-ingesting copepods mentioned in IV.B.2.a.(1) above.

No information has been found on spilled oil affecting numbers of the nekton other than finfish. Brownell (1971) and LeBoef (1971)

investigated the effect on marine mammals of the Santa Barbara oil spill. Numerous dead animals found after the spill, including gray, sperm, and pilot whales, dolphins, and elephant seal pups, were examined histologically and chemically for the presence of oil or pathological effects related to oil. No such oil or pathology was found and the deaths were attributed to natural causes. It was also noted that the number of deaths was not abnormally high.

Four species of marine mammals are known for Louisiana waters: the Florida manatee, bottle-nosed porpoise, pilot whale, and finbacked whale (U.S. Army Corps of Engineers, 1973). The most common of these is the bottle-nosed porpoise, a frequent inhabitant of bays and seashore waters. The two whales are not common, and the manatee, which has been placed on the Federal endangered species list, is very rare in Louisiana waters. On the basis of the Santa Barbara data alone, it is difficult to predict the effects of an oil spill on these mammals, but we presume they will be negligible.

In summary, we are unable to predict the total scope of the impact on nekton in quantitative terms. Based on past observations, we estimate that the overall impact will be minimal.

2. Impact on Benthic Marine Life

Environmental impacts which may be expected to affect benthic life adversely will result from the discharge of drill cuttings, accidental spillage of oil (and associated use of emulsifiers) and other toxic materials, and the burial of newly constructed pipelines.

Spilled oil which has not evaporated or been cleaned up or stranded on a beach, after being dispersed into the water as droplets, adheres to particulate matter and sinks to the bottom where it comes into direct contact with the benthos.

Data of Sanders, Grassle, and Hampson (1972) show immediate and nearly complete mortality of many forms of benthic animals following the spill of No. 2 fuel oil near West Falmouth, Massachusetts. The bivalve molluscs (clams, etc.) seemed especially vulnerable. As a rule, when levels of oil concentration in the sediment apparently decrease below a certain level with the passing of time, affected areas were recolonized by resistant forms, especially the marine polychaetous worm Capitella capitata. This generally occurred within three to six months of the initial oiling. With the passage of about 10 to 20 months, the more sensitive molluscs resettled many areas. However, at some harbor stations which apparently received a heavy oiling, some highly sensitive forms such as the

ampeliscid amphipods 1/ had not returned. Farther offshore, this required about six months.

During drilling operations, drill cuttings are separated from the drilling fluid, cleaned of any entrained oil, and discharged into the ocean. A diver survey during one operation offshore Louisiana revealed that the drill cuttings could be detected over a circle 100 feet in diameter. In a small area in the center, the deposit appeared to be about four feet thick. The same survey of the cuttings deposit showed that benthic animals either migrated up through the deposit as it accumulated or colonized even as deposition continued, because it appeared to be inhabited by several animals characteristic of "normal" benthic fauna.

If drilling operations were carried out over the relatively harder carbonate sand bottoms, it is possible that the highly productive seagrass beds might be smothered by the drill cuttings which are discharged overboard. Unfortunately, the offshore distribution of grasses is apparently patchy and not well known. Therefore, it cannot be said with certainty that such an impact would occur.

Also associated with these relatively hard bottoms are small to large populations of non-burrowing, attached benthic animals such

1/ A family of crustaceans related to the common beach hopper or beach flea.

as the sponges, soft corals, anemones, bryozoans, and others. The extent and duration of the impact are impossible to predict at this time. If the drill cuttings are similar in consistency and composition, colonization and repopulation could proceed rapidly. If, on the other hand, the drill cuttings were wholly foreign in consistency and composition, the deposit might remain barren for a long period or be populated by different types and numbers of animals.

The effect of drill cuttings may be further complicated by the periodic discharge of non-oil based drilling muds. In the past these have been assumed to be harmless. However, drilling muds often contain large amounts of barium compounds (sec. III.A.). The barium in drilling muds represents a serious, but as yet undetermined, threat to aquatic life, because it is known from upland operations that barium compounds have a severe, almost sterilizing effect on plant and animal life of the soil. 1/

Investigating on behalf of the Gulf Universities Research Consortium Offshore Ecology Investigations (1974), Dr. James I. Jones has found barium compounds to be above "normal" background levels in sediments of Grand Isle, Louisiana, where drilling has gone on for many years. Nevertheless, they are low enough to

1/ Environmental Protection Agency: "Economic and Social Importance of Estuaries". Estuarine Pollution Study Series No. 2. EPA Water Quality Office.

present no known biological hazards. Considered separately from drilling muds, we do not expect the regular discharge of drill cuttings to result in a reduction of the benthic communities of the continental shelf.

In water depths of less than 200 feet new pipelines are entrenched by jetting away the sediment beneath the pipe and allowing the pipe to settle into the underlying trench. Subsequent burial is allowed to take place naturally, primarily by reworking of sediments by bottom currents. The jetting process physically disrupts the sediments in its path and also causes resuspension of large quantities of sediment.

Most, if not all, benthic fauna are either destroyed by the jetting or raised into the surrounding water and rendered completely vulnerable to predation. Although recolonization would begin immediately, the native fauna could not be fully restored until seasonal reproduction cycles had been completed by representative species from adjacent areas, which would provide a supply of larvae to settle and enter the reworked substrate.

Turbidity resulting from resuspended sediment is capable of producing an adverse impact on filter-feeding molluscan and crustacean benthos by clogging the filter-feeding apparatus or

blocking respiratory surfaces. Casual observation has revealed that ocean currents carry the sediment and redeposit it at various distances, depending upon the particle size of the sediment.

Another possible source of impact during pipeline dredging is the resuspension of toxic heavy metals and persistent pesticides that may have been deposited in the area by a polluted stream and land runoff. The possibility exists that these toxic materials could be ingested by lower marine life and could then be magnified through the food chain until they accumulated in serious quantities in top carnivores, including species harvested for human food.

Obviously, we must conclude that the benthic community will be disrupted or destroyed in the path of pipeline dredging operations. We believe the duration of the impact will be short, with recolonization being completed within a year or two. The possibility of impact by resuspended toxic heavy metals and persistent pesticides exists, but the potential for the occurrence, location, scope and duration of the impact are unknown.

C. Impact on the Communities of the Coastal Zone

The wetlands include the Mississippi River mudflats, saline, brackish, intermediate, and freshwater marshes of the Louisiana chenier and deltas and the fringing saltmarshes on the landward side of the barrier islands. Estuarine areas encompass the marshes of Eastern Louisiana along the perimeter of the Gulf of Mexico. These areas have been described in detail in Sections II.D.1-5. and II.D.8. Dominant marsh vegetation consists of marsh grasses. Algae and epiphytes are also among the common primary producers. Dominant marsh fauna include the detrital consumers and insects, although the most noticeable animals are the waterfowl and other birds, the furbearing mammals and, in the less saline marshes, the American alligator. Marsh fauna is further described in Section II.D.6.

Adverse impacts resulting from offshore oil production which are possible in the wetlands and estuaries of Louisiana include: pollution by crude oil and subsequent hydrocarbon uptake by organisms, environmental disturbance of habitats during pipeline construction operations, and loss of habitat when land is utilized for onshore pipeline terminals, gas and oil treating facilities.

A representative of the industry considers that the existing pipeline system will be adequate to contain new production

resulting from this sale. However, should pipeline construction be later deemed necessary, an Environmental Analysis Record will be written by the Bureau of Land Management to study the environmental effects of the pipeline construction and burial, and of onshore facilities.

We add that although pipeline installation severely affects organisms in the areas of construction, past experience in the northeastern coastal Texas marsh - which is similar to parts of the western Chenier of Louisiana - has shown that recovery of biota over the refilled pipeline ditches is largely completed during the following growing season. During recent field reconnaissance by Bureau of Land Management personnel, which included aerial surveillance in addition to surface travel and onsite inspection, it proved difficult and in some cases impossible to locate the routes of several pipelines laid through the marsh of eastern Texas three years before. However, in the deltaic marshes of eastern Louisiana, the flotation of oil pipelines in canals up to 40 feet wide create a permanent alteration of the environment (St. Amant, 1971) as was also witnessed by Bureau of Land Management personnel. Changes in water circulation resulting from such canals may be impeded by the construction of dams and gates. However, pipeline flotation and access canals are believed by some to be responsible for an increasing erosion rate of the

marshlands (St. Amant, 1970, Gagliano and van Beck, 1970). In order to minimize ecological damage which results from such canal dredging, it has been suggested (St. Amant, 1972) that pipelines should be confined to specific corridors and should not be constructed at random from point to point and dredging done in such a way as not to disrupt normal drainage patterns.

Depending upon the quantity and frequency of crude oil being dispersed into the ecosystem and the time of exposure of organisms to these hydrocarbons, the introduction of petroleum into the ecosystem may create disturbances hazardous to the environment. Existing information on the actual effects of hydrocarbons on estuarine and wetland life is far from conclusive. However, accounts of biologic disruptions, or the lack thereof, following accidental spills from tankers and their operations (an activity unrelated to offshore production), from several controlled experiments, and faunal surveys in areas of oil production, do provide a limited basis for understanding the role of crude petroleum in the ecosystem. Future studies in coastal waters considered for possible leasing will considerably broaden the basis. Whenever possible, the following sections discuss possible impacts on biota with respect to such factors as quantity, frequency of occurrence, and duration of hydrocarbons in the marshes, bay and sound, beaches, and artificial and hard substrates of Louisiana. Pertinent information will be included,

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when available, concerning such categories of potential impacts as organisms response to oil, direct toxicities, both lethal and sub-lethal, incorporation or uptake of hydrocarbons by organisms, and oil coating.

1. Bays and Estuaries

Largely depending on the quantity of oil spill, differing impacts may be expected which are directly related to oil concentrations near the spill area. Large spills, such as those resulting from tanker accidents, have demonstrated that definite biological damage can result from exposure of living organisms to high concentrations of petroleum hydrocarbons. For example, when the Tampico-Marú ran aground off the coast of Baja, California in 1957, 50,000 to 60,000 barrels of diesel fuel caused widespread mortality among many benthic organisms of the area. These animals included lobsters, abalones, sea urchins, starfish, mussels, clams and smaller forms. Such damage occurred along the shoreline and up to depths of 15 to 25 feet (North, 1973, Ketchum, 1973). Recovery occurred gradually over several years' time and began with a profuse bloom of subtidal algae within four months after the wreck (North, 1973). This latter development probably resulted from the absence of grazing animals which had been eliminated by the spill. The diesel fuel of the Tampico-Marú would be considered more highly toxic than the crude oil produced by offshore drilling operations because it contained

a greater concentration of aromatic hydrocarbons. Petroleum which contains a greater amount of aromatics are usually considered more toxic (Clark, 1973). However, both crude oils and their refined products contain compounds that are toxic to species of marine organisms (Ketchum, 1973).

Studies on toxicities of petroleum on marine organisms are few but increasing in number. Mironov (1971) as cited by Ketchum (1973) tested toxicities of crude oil (unspecified type) on eleven phytoplankton species and found that cell division was delayed or inhibited by oil concentrations ranging from .01 to 1000 ppm and that copepods were sensitive to a 1 ppm suspension of fresh or weathered crude oil. In addition to inhibiting the growth of suspended phytoplankton in the water column, similar effects may be expected upon cells of benthic and epiphytic algae along the bottom and edges of estuaries (Stone, 1972)

According to Boesch (1973), several early studies have demonstrated the effect of petroleum hydrocarbons in retarding phytoplanktonic growth although he states that "...little is known of how oil affects physiological processes of organisms other than vascular plants". According to Boesch:

"Gordon and Prouse (1972) studies in situ the effects of some crude and refined oils on marine phytoplankton photosynthesis. At low concentrations (less than 45

ug/l bicarbonate uptake 1/ was increased as much as 20% over controls. At concentrations greater than 50 to 100 ug/l of crude and No. 2 and No. 6 fuel oils, uptake was significantly decreased."

Yet North (1973) states that our knowledge of the effects of petroleum upon phytoplankton is woefully inadequate. He affirms that while large scale effects on permanently planktonic species may be small, influences on larvae and reproductive cells of benthic species might be significant.

The bays and estuaries of Louisiana are a highly productive ecosystem as is emphasized in Section II.D.8. Detrimental effects upon the primary productivity of these ecosystems would result in a decrease in the planktonic food supply of the large menhaden, shrimp and other fisheries in addition to directly toxic effects of crude petroleum on the fauna and flora. Ketchum (1973) cautions that while effects of petroleum depend upon proximity to and type of oil released, "Any release of oil into the environment carries a threat of destruction and constitutes a danger to world fisheries."

However, other authors believe the adverse effects of petroleum hydrocarbons on the biotic communities of Louisiana are less significant.

1/ Bicarbonate uptake is a measure of phytosynthetic activity.

St. Amant (1973), speaking of the oil producing structures in the bays, offshore areas and marshes of his State says:

"Louisiana's coastal areas with more than 25,000 producing wells, with some fields that have been in production for more than 40 years, and most of which has existed for 20 years, serves as a types area of high production and long-term pollution."

Yet St. Amant, aware of possible environmental damage which may result from "... chronic mismanagement of the environment...". (See section IV C 2) states:

"Long-term exposure in Louisiana does not seem to have resulted in significant changes in the biotic productivity of the marine system and the presence of normally occurring hydrocarbons at levels of from 100 to 500 ppm. in bottom mud tend to confuse attempts to determine accumulative levels of petroleum hydrocarbon in the substrate."

While studies cited previously in this section indicate the retarding effect of petroleum or primary productivity, it is St. Amant's opinion based on his experience that there has been no decrease in overall productivity in Louisiana resulting from introduction of crude oils into the ecosystem (St. Amant, 1973).

The presence of oil consuming microbes which consume limited amounts of hydrocarbons as documented for Barataria Bay, Louisiana (Stone, 1972) may partially account for the reported lack of environmental damage.

Onuf (1973) studied the effects of petroleum in the field near refinery effluents, natural seeps and drilling operations and in the laboratory. He cites a study of Spears (1971) in which the biological effects of oil production upon marine organisms were considered. In the study, Spears compared the yields of harvestable organisms from waters receiving oil field wastes in Texas with nearly waters which were relatively unaffected by human activity and concluded that there was a serious detrimental effect to commercially important organisms due to oil field wastes. However, the high concentration of oil in the creek under study (16 ppm) and the effects of brine effluents made it hard to extend the study to OCS operations. Onuf concludes that "...demonstrable effects of long term pollution by oil are very local and often associated with acutely toxic levels. Where more general effects have been suggested, confounding factors have not been satisfactorily discriminated." According to Onuf:

"The fact that a long period of large scale oil extracting activities has not reduced the productivity of major fisheries along the Gulf Coast of Louisiana suggests that populations in offshore regions can accommodate long term, low level intrusions of oil. The case for estuaries cannot be so succinctly stated nor dismissed. No respectable field experiments (on estuaries) have been reported."

Onuf points out that lab experiments have revealed "...dislocations of normal behavior..." by organisms in concentrations of oil found in some estuaries and that adverse synergistic interactions between oil, temperature and salinity stresses warrant direct testing by field experiments. He feels that refinery effluents cause more environmental harm than drilling operations, although he maintains that no predictions are possible on how serious the damage may be.

Individual faunas have been studied for their biological responses to oil. The effects of oil on subtidal benthic communities such as those found in bays were studied by Fauchald (1971) in response to the Santa Barbara spill. One of the major organisms studied was the frequently occurring marine worm Listriolobus pelodes (not present in the northern Gulf of Mexico). Fauchald concluded:

"There are no indications that it has been totally exterminated, or even reduced markedly in the vicinity of Platform A. In fact, in one of the box cores taken in October, 1969, as part of a bacteriological survey, a relatively small but otherwise normal, L. pelodes was found sitting in its shallow depression surrounded by an inch-thick layer of block mud mixed with crude oil."

The author theorized that fluctuations in numbers of benthic animals observed may have been due to natural causes or oil well drilling in the area, from the oil spill or from sewage pollution. Unfortunately he could not isolate the effects resulting from the spill alone.

In the Arrow spill study (Operation Oil, 1970), lobsters appeared to be clean and normal in behavior. Scallops taken near heavily oiled beaches had no oily taste, but chemical analysis of scallops, along with periwinkles, sea urchins, and other bottom dwelling organisms revealed that oil was present in muscle tissue, the digestive tract and other organs.

Galtsoff (1959) noted that the major effects of industrial wastes and the soluble components of crude oil on oysters is a reduction

in the rate of various physiological functions, principally ventilation of the gills. Specifically, these pollutants cause a reduction in the amount of time during which an oyster opens its valves for feeding and respiration, and also interferes with the coordination of the ciliary motion with the result that the pumping capacity of the gills is reduced. The reduction in feeding time (simultaneous with respiration) results in a lowered growth rate and poorer quality oyster meats. It is well known that oysters can become contaminated with oil (Erhardt, 1972; Galtsoff, op. cit.; Mackin, 1962) but there is still scientific debate as to whether oysters can cleanse themselves when returned to clean water. See also Section IV. C. 3. on shellfishes.

Teal and Stegeman (1973) exposed to oil two oyster populations differing in fat (lipid) content and found that petroleum hydrocarbons were accumulated by both groups of oysters. The oysters with a higher lipid content collected the greater amount of hydrocarbons. When these animals were returned to clean water, the hydrocarbon content was rapidly, though incompletely, discharged. These researchers also found that the petroleum contained in the oysters differed from the contaminating oil by showing a greater aromatic content. This result suggested that more aromatic fractions of oil were more likely to be incorporated into the oyster's tissue. The possibility that

the oysters were themselves modifying the oil could not be discounted, however.

The accumulation of hydrocarbons in oyster tissue, as was demonstrated by Teal and Stegeman (1973), raises the question of petroleum hydrocarbon incorporation into other members of a food chain which eventually reach higher animals. There is, at present, no evidence that petroleum hydrocarbons are magnified in higher levels of the food chain through consumption of contaminated oysters or fish.

According to Boesch (1973):

"It has been suggested that petroleum hydrocarbons might be taken up by organisms, protected from degradation, accumulated and concentrated along a food chain."

Blumer, Mullin and Guillard (1970) found that a biogenic, natural, hydrocarbon produced by certain marine phytoplankters may be accumulated by the copepod, Rhincalanus nasutus and the hydrocarbon was also found in oysters, herring and shark's liver. Yet, the larvae of the barnacle Balanus ballanoides maintained in a suspension of crude oil, ingest, without apparent harm, droplets of oil which later appear in the feces (Freegarde, 1970) as cited in Ketchum (1973)). On the other hand, according to Ketchum (1973):

"Hydrocarbons ingested by marine organisms may pass through the wall of the gut and become part of the lipid pool 1/ (Blumer, et. al., 1970). When

1/ Lipid pool - collection in tissue of a group of organic compounds which make up the fats.

dissolved within the fatty tissue of the organisms, even relatively unstable hydrocarbons are preserved. They are protected from bacterial attack and can be transferred from food organisms to predators and possibly to humans."

Boesch's (1973) conclusion is, that, although "...it appears that petroleum hydrocarbons can be transferred via feeding, at this time there is no convincing evidence for biological magnification as documented for chlorinated hydrocarbons."

In summary, while current research indicates the potential hazards of chronic hydrocarbon addition to the environment, field observations in Louisiana do not indicate that chronic pollution has reduced overall productivity. However, in the matrix analysis, those tracts which rate units of 50 or more in categories which consider effects on estuarine life (highly productive areas) should be singled out for particular consideration on environmental impact.

2. Marshes

The delicately balanced marshland ecosystems which have been described in Section II D. 1-5 of this statement are subject to impacts resulting from sporadic accidental spillages and from chronic oil pollutants and pipeline construction. In the absence of tanker operations, accidental oil discharges will be restricted to oil washed ashore from unforeseen platform accidents or pipeline rupture. Chronic pollutants may result from pipeline leaking and refinery effluents. St. Amant views chronic pollution as posing greater environmental jeopardy than the more obvious damage which results from accidental oil spills. To quote St. Amant (1972) directly:

"Significant ecological or environmental damage must be viewed as a permanent or long term change in the ecosystem that reduces its efficiency and subtracts from its overall productivity. Such a change may be the result of sudden catastrophic events with obvious results; more often, it represents the long term cumulative effects of apparently innocuous happenings and of chronic mismanagement of the environment."

While little has been done to methodically answer ecological questions concerning effect of hydrocarbons on highly productive marshland ecosystems, some recent advances have been made. It has been established that large inputs of petroleum into marshlands may result in immediate faunal mortalities and the retarding of floral species.

For example, British studies of salt marsh oiling followed a "moderately severe" spill of crude oil from the tanker Chryssi P. Goulandeis in Milford Haven estuary, Wales (Baker, 1971; Cowell, 1969; Cowell and Baker, 1969). A survey two weeks after the spill showed that oily saltmarsh vegetation had yellowed and was dying although new green growth was showing at the base of some species. Some plant communities remained without new growth a year later. While observations were not made on saltmarsh fauna, mortality was presumed high for aquatic animals in the spill area.

Baker (1971) sprayed saltmarshes in southwest Wales with fresh Kuwait crude oil at different times of the year. Results indicated that a light pollution with crude caused little long term damage to most salt marsh plants, whatever time of the year the pollution occurred, although most damage occurred in warm months. Oiled leaves died but perennial plants recovered well with new growth; annual plants were severely reduced in numbers because they could not recover by new growth before fall. Seed production of annuals was inhibited for one season.

Mackin, (as cited in Stone, 1972) studied the effects of crude oil on a number of Louisiana marsh grasses. The species included saltgrass, Distichilus spicata, cordgrass, Spartina alterniflora, and Bates grass Batis sp. which are the dominant species in the fresh and brackish marshes (Section II, D 1-2). Mackin's data strongly implied that long term exposure to petroleum at relatively high concentrations is

quite lethal, and that immediate and rapid cleanup is therefore critical and essential (Stone, 1972).

Boesch (1973) notes that while:

"... more study and quantification are required, it seems likely that petroleum hydrocarbons, even those not soluble enough to be directly lethal, may inhibit photosynthesis for a short time and under the proper conditions."

The proper conditions refer in part to exposure of plant organisms to petroleum hydrocarbons at concentrations greater than 50 to 100 ug/l (Gordon and Proust, 1972) as cited by Boesch (1973).

Because of the obvious harm incurred upon marshes from exposure to large spills and the importance of these wetlands as an energy producing area, tracts which rate a value of over 50 in the matrix analysis for "highly productive areas" should be singled out for particular environmental consideration.

3. Beaches

The beaches in Louisiana include the sandy beaches which border the Gulf of Mexico side of the barrier islands and the beach along the Chenier ridge of along the westernmost shoreline of the mainland. Oil producing areas are found primarily in the eastern half of offshore Louisiana.

Beach fauna suffer a severe impact from offshore oil spills as is evidenced by the results from several previous accidents. Crude oil from the Santa Barbara and Torrey Canyon spills reached the beaches causing mortalities of intertidal and beach fauna. Much of the mortalities in the Santa Barbara incident were due to smothering of intertidal animals by coating with crude oil. Mitchell (et al, 1970), noted that populations of mussels, barnacle, and periwinkles survived the initial exposure in the absence of "tar" coating. According to Ketchum (1973):

"At locations where the oil film (of Santa Barbara) was not so obvious intertidal organisms were not severely damaged (originally Foster et al, 1970)."

Detergents used to disperse oil in the Torrey Canyon spill complicate an assessment of damage caused by the oil. However, indications were that mortalities were light on beaches where detergents were not employed (North, 1973).

The spill of #2 fuel oil in West Falmouth, Massachusetts, from the tanker Florida resulted in a high number of mortalities among intertidal and beach fauna. This spill eventually covered nearly three miles of coastline and resulted in high mortalities (Blumer et al, 1971). Results from studies of this spill demonstrate that immediate catastrophic and later chronic effects can result from a single oil spill

(Sanders, 1973). In this paper Sanders concluded that species density patterns for polychaetes, gastropods, bivalves, and ampeliscid amphipods which are residents of the subtidal benthos, follow stress patterns depending on distance from the spill and time of exposure of organisms to the fuel oil.

Most pollution studies for the littoral zone are concerned with rocky shoreline of New England and California and their characteristic assemblages of seaweeds, barnacles, limpets, anenomes, etc., rather than for sandy beach communities, composed of certain shellfish species, limpets and crustaceans which have not been as extensively studied. To generalize, where organisms have been covered by crude oil and Bunker C fuel oil, death is primarily blamed on smothering due to physical coating (e.g. Chan, 1972; Nicholson and Cimberg, 1971). When the pollutant has been a lighter refined fuel oil, mortalities and stress have been primarily associated with toxic effects of the oil (e.g. North, Neushul and Clendenning, 1964).

In the event of a major spill beach communities may be expected to suffer considerable damage. Effects on birdlife are discussed in a separate section. Tracts which rate a factor above 50 for the category of beaches should be singled out for particular environmental consideration.

4. Artificial and hard substrate communities

Communities of animals on artificial and hard substrates are most common along the jetties and pilings which protect the entrances to

Mississippi River passes and along the numerous pilings and boat docking structures distributed along the coast. They are also found on oil drilling and producing structures.

Although communities of anenomes, limpets, mollusks, barnacles and other forms of marine/estuarine life which attach themselves to the substrate are prolific in California and New England, few of these animals have a wide distribution in Louisiana because of the predominately soft-substrate beaches of the State. Those invertebrate sessile 1/ organisms which do colonize the jetties of the Mississippi River are largely protected from contact with oil resulting from a spill due to the Gulfward movements of the River.

Studying the effects of the Chedabucto Bay spill of Bunker C oil, Thomas (1973) found that most of the 20 species of animals observed suffered from the effects of coating with subsequent smothering of animals but were otherwise little affected. Barnacles showed no unusual mortalities and settlement of larvae occurred in following seasons. Periwinkles, common intertidal mollusks, remained abundant and continued to occupy the same general zones. A seaweed, Fucus, however, declined over the next 10 months and, where oiling was severe, recolonization had not been successful at the time of publication (1973).

Attached seaweed which declined as a result of contact with petroleum hydrocarbons dispersed from the Torrey Canyon, later recovered in the absence of grazing organisms.

1/ sessile = non-moving; attached

The effect of hydrocarbons upon artificial and hard substrate communities will be considered under the heading of beaches in the matrix analysis. Particular environmental consideration should be given to these tracts.

5. Impact on Birdlife

In the past, the injuries and deaths of thousands of seabirds, shorebirds and waterfowl have been the most obvious impacts of massive oil spills. According to Clark (1973), the only organisms damaged directly by oil pollution on a sufficient scale to affect the world, or even local populations, are seabirds. While seabirds such as auks (murres, Uria lomvia, razorbills, Alca torda, puffins, Fratercula arctica, and guillemots, Cephus grylle), may be considered as part of the offshore environment for a considerable part of their lives, shorebirds and waterfowl spend a greater percentage of their life in the coastal zone.

Although the auks, and puffins (Order Pygopodes - diving birds, family Alcidae), which are the subject of Clark's (1973) study, are arctic and do not inhabit the Louisiana coastal or offshore environment, several closely related seabirds do inhabit these environment during the winter months. These related birds, which belong to the same Order as the auks are the grebes (family Colymbidae) and loons (family Gaviidae). Estuarine birds are listed in Section II.D.6.

The causes of mortality and damage to bird fauna from hydrocarbon contamination are usually complex and may result from several interacting factors. Sheldon (1971) states that:

"Clogging of plumage greatly reduces (a bird's) insulating properties, while ingestion of oil during preening can cause a variety of pathological conditions including severe enteritis and necrosis of the duodenum... This, in combination with increased heat losses, may reduce feeding activity and a marked drop then occurs in the fat reserves of the bird. It is in this critical condition that most oiled birds arrive on the shore where further stresses are put on them by cleaning and attempts at rehabilitation. It is therefore not surprising that the mortality rate of cleaning centers is very high indeed."

Table 2 on the following page lists the recent oil spill related mortalities as noted in the literature.

Internal contamination of birdlife may follow preening of feathers. Internal toxicity by polluting oils is a definite factor in the observed mortalities due to exposure to petroleum hydrocarbons as was demonstrated by Harting and Hunt (1966) as cited in Ketchum (1973). These experiments determined the lethal dose of oil to certain ducks ranges from 1 to 4 ml per kilogram (ml/kg) when the birds were kept outdoors under environmental stress. A duck was expected to clean 50% of the polluting oil from its feathers during the first few days after contamination. Harting and Hunt concluded that if a duck acquired 7 grams of oil on its feathers, it could ingest oil to meet the experimentally established lethal dose of 1 to 4 ml/kg.

The effects of long term chronic pollution on birds in Great Britain have been studied by Clark (1973). Auks, arctic species

Table 2. Some Oil Spill-Related Bird Mortalities, World-wide

No. Birds Affected	Source of Spill	Material Spilled	Quantities	Location	Year
3,600 200	Platform not specified	crude oil light diesel oil	18,500 bbl.	Santa Barbara, Calif.	1969 a,f
9,000 (60% auks)	not specified	heavy fuel oil		Firth of Forth, Scotland	1969 b
1,000	not specified	"Oil"		Aberdeenshire, Scotland	1970 b
12,000 (Contaminated) (mostly guillemots)				Southwest England	1970 b
1,000 (Contaminated)	Tanker	fuel oil		Northeast England	1970 b
2,300 (ducks, grebes, auks)				Southern England	1970 b
None	Tanker <u>Arrow</u>	Bunker C	36,000 bbl.	Chedabuctor Bay, Nova Scotia	1970 b
3,500 (Contaminated)	Platform-Chevron	crude oil	30,500 bbl.	Offshore Louisiana	1970 b,f
1,000 (Contaminated)	Tanker <u>Delian Appollon</u>	Bunker C	240 bbl.	Tampa Bay, Florida	1970 c
96,000	not specified	weathered oil		Martha's Vinyard, Mass.	1970 b
none	not specified	"Oil"		Kodiak and adjacent Is., Alas.	1970 b
6,000	Shell Platform	crude oil		Offshore Louisiana	1970 d
	Tanker Oregon Standard				
		Bunker C	45,000 bbl.	San Francisco Bay, Calif.	1971 e
none	Amoco Platform	crude oil	several small slicks	Offshore Louisiana	1971 d,g

a--Straughan, 1971a. b--Environment Editorial Staff, 1971. c--Unpub. Rep., Florida Game and Freshwater Fish Comm., Tallahassee.

d--Testimony of Dr. Carl Oppenheimer, OCS Public Hearing, New Orleans, Louisiana. Aug. 23, 1972.

e--Chan, 1972.

f--U.S. Geological Survey, 1972.

g--Baker, J., 1971. A review of world oil spillages, 1960-71. Oil pollution research unit. Pembroke, Pembroke, England.

which migrate to Great Britain (and again are similar to grebes and loons) have a low rate of replacement and are thus more susceptible in the long-term to high early mortality from natural causes than those which are more prolific. Clark states that "Diving sea ducks have a greater reproductive potential and do not appear to have declined despite repeated heavy losses from oil pollution" (an exception is made for long tailed ducks and for velvet scoters).

An illustration of the operating dynamics in bird populations is described by Clark (1973) referring to the eiders, Somateria sp. Eiders, northern ducks which do not inhabit Louisiana, are related to the ring-necked duck, Marila collaris, lesser scaup duck, Marila affinis, redhead, Marila americana, pintail, Dafila acuta, shoveler, Spatula clypeata, gadwell, Chaulelasmus, streperus, green winged teal, Nettion carolinensis, merganser, Mergus americanus, and other members of the family Anatidae (ducks).

"It is possible to kill a larger proportion of a local (eider) population by a single oil spill in winter: 50% of the Jay estuary population was lost in 1968 in the Tank Duchess oil spill (Greenwood and Kiddie, 1969). Furthermore, since the birds return to the same nests to breed in successive years, losses must be made good by their survivors. After the Palva oil spill in the Kokar peninsula, in which 25-33% of the local population was killed, reproduction in the following year was exceptionally successful and recovery of the population is expected to be rapid (Soikkeli and Virtanen, 1972)."

Several European populations of seabirds have declined significantly and this is attributed to both major and minor spills from shipping accidents, tanker discharges, oily wastes from shore discharges (Clark, 1973). However, downward trends in European bird populations may also be the unfortunate result of industrial pollution other than from petroleum. The use of pipeline transport systems in Louisiana will present spillage from the above sources, although potential pipeline leakage must be considered as a possible source of oil.

In the Gulf of Mexico, bird mortalities due to oil pollution are less frequent due to the fewer number of spills which have occurred there. However, damage to birdlife has been documented for the oil spill in Tampa Bay, Florida. On February 14, 1970, the Tanker Delian Appolon ran aground, spilling a cargo of Bunker C oil into Tampa Bay. It was not possible to assess with accuracy the total number of birds harmed or killed because of the northward migration of waterfowl then occurring. Presumably, some of the oiled birds left the immediate area during their migratory flight.

It is known that approximately 3,500 oiled birds were captured and treated although an accurate measure of success is not

given (Florida Game and Freshwater Fish Commission, unpublished Report). Clark (1973) estimates that, as a rule, only 10-25% oiled birds which die offshore wash up onto the beach. He does not estimate the number which make it to shore after contamination.

During March, 1970, an oil spill occurred at the Chevron platform "C" located 10 miles east of the 48,000 acre Delta National Wildlife Refuge and 9 miles southeast of the 7,500 acre Breton National Wildlife Refuge situated on Breton and Chandeleur Islands.

The Department of the Interior (1970) reported little unfavorable impact to birdlife as a result of this spill because it occurred at a time when many species were temporarily in their northern breeding grounds. In addition, the Mississippi River riptide served as an effective barrier to the shoreward movement of oil when onshore winds did occur. However, had the spill occurred earlier in the year or during the winter, large numbers of migratory waterfowl could have been destroyed.

Indirect impacts from OCS operations which would result from pipeline burial through beach and marsh areas would result in the loss of all nesting areas in the path of the pipeline.

In the matrix analysis, those tracts which rate an environmental impact factor of 50 for beaches and wetlands should be given particular consideration for the effects of oil contamination of shorebirds.

TREATMENT OF OILED BIRDS

The following summarizes some of the observations by Clark (1973) and others on the subject of treating oiled birds which have been the victims of a spill.

Treating of oiled birds has a history of lack of success due to additional stress put upon the animal by handling, toxic effects of detergents, the need for a long recovery time in captivity, loss of water repelling activities and increased susceptibility to disease.

Some cleaning methods have recently been developed which will assist the general public in caring for oiled birds with a greater degree of success than has previously been the case and are suggested for general use by Clark (1973).

In addition to the obvious necessity to promote safety to minimize spills of oil, this same author suggests that measures to reduce mortality during the migration and breeding season, would be the most direct way to counter losses caused by oil pollution.

D. Impact on Commercial Fisheries

Offshore oil and gas operations interfere with commercial Gulf fisheries in three general ways.

1. Removal of Sea Floor From Use

All shrimp and industrial bottom fish are caught by dragging a large trawl across the sea floor. All sites occupied by drilling or production platforms and attendant service boats and barges must be avoided by trawlers. If the structures are jack-up drilling rigs or permanent production platforms, the area of the sea floor removed would amount to 2 to 5 acres for each structure. In deeper waters (over 300 feet), a semi-submersible drilling rig with its anchoring system would occupy up to 325 acres (assuming a 1500 foot anchoring radius). The duration of exploratory drilling ranges from under 45 days for a single well to around six months for multiple well explorations. Permanent production platforms may remain in place for 10 to over 20 years.

Emplacement of structures on snapper and grouper banks may have an adverse effect on commercial and sport fishing. Structures are known to attract large numbers of fish, including snappers and groupers, and if a structure attracted a significant portion of the resident populations of a bank, it may be more difficult to fish for these valued species, especially for the larger vessels which must maintain a safety clearance from the structure. This effect is speculative and has not been documented. What is known is that commercial and

sport fishermen do work around the rigs because of the sizable populations of snappers and groupers commonly found there.

Table 3 contains the tracts which the National Marine Fisheries Service has indicated as having rises or parts of rises which normally serve as snapper and grouper banks. "Depth of Rise" in Table 3 refers to the shallowest point of the rise, and "Bottom Depth" is the range of depth around the rises. We have upgraded the proximity values of structures in the matrix analyses of these tracts to reflect the possible adverse effect on commercial and sport fisheries.

The probability that permanent platforms will be erected on any given tract, based on past exploration success rates, is about 35%. In other words, approximately 1 out of every 3 tracts offered for lease will eventually require the erection of a platform (or platforms) for its development. Many tracts, about 2 of every 3 offered, may never be developed. It is estimated that each full tract (5,760 or 5,000 acres) developed will average two structures erected. Using the actual dimensions of a platform, two per tract would physically cover approximately 0.02% (1.8 to 1.0 acres) of each tract's sea floor. Taking into account a navigational safety zone around each structure and using the 2 to 5 acres per platform figure, trawlers may be denied up to 0.2% (10 acres) of the sea floor per developed tract.

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Table 3 Tracts With Significant Rises or Parts of Rises
Which Normally Serve As Snapper and/or Grouper Banks

<u>Tract</u>	<u>Block</u>	<u>Depth of Rise (fm)</u>	<u>Bottom Depth (fm)</u>
<u>Ship Shoal - South Addition</u>			
165	350	29	59-66
<u>South Timbalier</u>			
176	317	41	83-86
<u>Garden Banks</u>			
226	N638 E103	30½	50-111
228	N638 E107	35	57-121
240	N639 E102	part of 50	100-111
241	N639 E103	36	100-117
242	N639 E106	part of 37	100-104
243	N639 E107	part of 37	57-100
<u>New Orleans South No. 1</u>			
246	N637 E127	part of 52	100-152
249	N638 E127	44	56-100
250	N638 E128	part of 52	100-152

Total number of platforms required to develop a lease area and their spacing relative to each other are important factors in considering potential impact on commercial fishing activities. Because it is impossible to determine these factors in advance of a proposed sale, a special stipulation (see section IV., Mitigating Measures) has been suggested as a responsive measure to an additional impact it is believed will result if careful planning and coordination are not undertaken.

2. Creation of Obstructions on the Sea Floor That Cause Damage to Trawling Nets

The obstructions referred to here are underwater stubs, large pieces of debris, and unburied pipelines.

The source and nature of stubs was described in section III. As already stated, Coast Guard regulations require that stubs be marked by a buoy at the surface if located in 80 feet or less of water. However, the Coast Guard has informed us that in spite of regular maintenance and replacement, these buoys are frequently found to be missing. If a trawler tows his net across a stub, the net will certainly be badly damaged or lost.

Large pieces of debris, such as equipment, piping, structural members, tools, and the like, may accidentally be lost off a platform, service boat or barge. If this occurs off or very near a platform, it may be located easily by divers and retrieved. However, if it is lost off a boat or barge underway, the location may not be known accurately

enough to allow its subsequent recovery. Depending on the size and weight of items lost in this way, varying amounts of damage may be done to trawling nets of fishermen unlucky enough to snag them.

It has also been reported 1/ that unburied pipelines (beyond the 200 foot depth contour) pose a serious problem to the shrimp trawling operations. The following table of shrimp catch statistics from the area between the Mobile Bay, Alabama to Sabine Lake, Louisiana emphasizes the catch by depth of water and value. 2/ These data were generated from NMFS Shrimp Fishing Grid Zones 11.0 through 17.2 and the internal water areas within the zones. (See Table 4).

Over 72 million pounds or 90.7% of the catch was harvested from waters landward of the 20 fathom depth contour. The monetary value of these heads-off dock side shrimp is more than \$54 million or 84% of the total catch. The value per pound varies from \$0.55 to \$1.21 within the 20 fathom zone. Seaward of the 20 fathom contour the value by depth zone varies from \$1.30 to \$1.45 with the 31-35 fathom grouping being the highest. These data correspond to the generalized portrayal of shrimp grounds in Fig. 1. 3/

1/ Testimony of James C. Farrelly, President, Louisiana Shrimp Association, presented at August 23, 1972 OCS Public Hearing, New Orleans, Louisiana.

2/ Data from Department of Commerce, 1973, Gulf Coast Shrimp Data, Annual Summary, 1971, Current Fisheries Statistics No. 5925, National Marine Fisheries Service, NOAA.

3/ Fig. 1 is a composite portrayal of the shrimp fishery depicted in Bureau of Commercial Fisheries' Gulf of Mexico Shrimp Atlas, Circular 312, U.S. Department of the Interior, 1969.

Table 4 1971 Shrimp Catch by Depth of Water
from Mobile Bay, Alabama to Sabine
Lake, Louisiana. (units of thousands)

Species	0-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	+40		Total	Percent Species Caught
Brown	24,356	5,740	5,867	3,451	2,305	2,550	1,638	573	68		46,549	58.3
White	21,524	9,133	1,613	309	130	53	16	1	-		32,779	41.1
Pink	17	134	34	3	1	3	-	-	-		192	.2
Other	303	7	-	-	-	-	-	-	13		324	.4
Total	46,200	15,015	7,514	3,763	2,436	2,605	1,654	575	82		79,843	
Percent of Catch	57.8	18.8	9.4	4.7	3.1	3.3	2.1	0.7	0.1			
Value	25,376	16,449	8,014	4,568	3,366	3,709	2,398	822	106		64,808	
Percent of Value	39.2	25.3	12.4	7.0	5.2	5.7	3.7	1.3	.2			
Value per pound	0.55	1.10	1.07	1.21	1.38	1.42	1.45	1.43	1.30		0.81	
Reference: Department of Commerce 1973, Gulf Coast Shrimp Data, Annual Summary 1971, Current Fisheries Statistics No. 5925, NOAA XCFSA 5925 GCS, 30 p.												

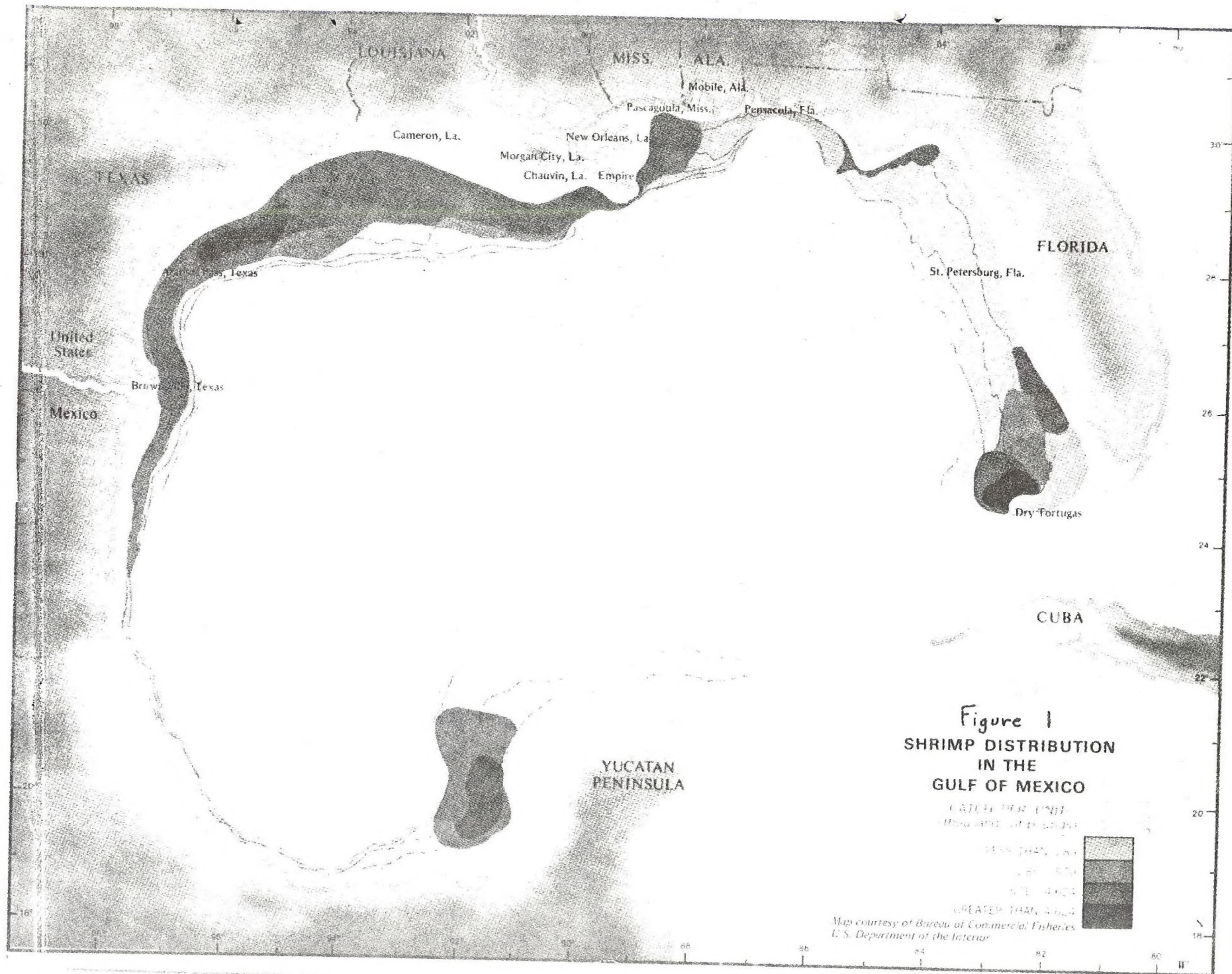


Figure 1
SHRIMP DISTRIBUTION
IN THE
GULF OF MEXICO

CATCH PER UNIT
OF EFFORT (CPUE)
0-100
101-200
201-300
GREATER THAN 300



Map courtesy of Bureau of Commercial Fisheries
U.S. Department of the Interior

Pipeline corridors will be established, wherever possible, in the area of this sale. (Sec. IV.C.) Pipelines within the corridors will be buried to a depth of 3 feet out to the 200 foot contour. Less than three percent of the total shrimp catch in the central Gulf is seaward of the 200 foot contour. Additional measures to require burial of pipelines seaward of the 200 foot contour for protection of the small shrimp catch taken in that area in light of its value could be considered if information is provided concerning the frequency, location, or severity of incidents involving trawling operations and unburied pipelines.

3. Loss of Catch Due to Oil Contamination

In an area of an oil spill, commercial fishing activities are inhibited in order to avoid contamination of fishing equipment, vessels and catch.

The following sections will describe effects of crude oil on some commercially important fish.

4. Impact on Commercial Fish Species

Shellfish

Numerous studies on the effects of oil on commercially important shellfish indicate that these invertebrates may both absorb, and to varying extents, clean themselves of hydrocarbons.

Oysters, Crassostrea virginica, may accumulate oil through feeding activity in a pollution zone. As the oyster feeds, it pumps water over a series of gill filaments which trap food particles such as phytoplankton. Hydrocarbons in the plankton may be incorporated in the oyster. Erdhart (1972) has found that oysters taken near the entrance to the Houston Ship Channel in Galveston Bay, Texas are contaminated with a high content of petroleum derived hydrocarbons. Because aromatic hydrocarbons are more soluble than paraffinic and naphthenic hydrocarbons, the oysters most likely take up the aromatic fraction as a water solution through their gills, and as filter feeders by accumulation of particulate food matter. The author found the composition of oyster contaminants to be similar to many Texas crude oils, among them Conroe crude, Beaver Lodge crude and Lee Harrison crude.

Results from Blumer's (1971) study on more highly aromatic #2 fuel oil rather than on crude oil suggest that oil becomes part of the organism's lipid (fatty) pool. Blumer noted that the oil in specimens he observed from a Massachusetts oil spill remained relatively unchanged in composition or quantity. He reasoned that if the oil were localized within the digestive tract, a shellfish could eliminate it rapidly. But the persistence of the hydrocarbon over a time period of six months, its presence in adductor muscle tissue and the lack of further degradation of these hydrocarbons indicate that it becomes part of the organism's lipid pool.

Anderson (1973) observed oysters, Crassostrea virginica and clams, Rangia cuneata, exposed to South Louisiana crude oil and to #2 fuel oil, and came to a different conclusion. Anderson found that both aromatic and saturated hydrocarbons are released from the tissues more rapidly; maintenance in clean water for periods of 24 to 52 days was reported sufficient to cleanse the tissues of delectable levels of hydrocarbons.

Teal and Stegeman (1973) measured the amount of hydrocarbons remaining contaminated in oysters after their return to clean water and found that a concentration of 34 wg/g wet wt. persisted in a "stable" compartment. The authors concluded that, while the oysters would not retain non-biogenic (petroleum) hydrocarbons permanently, complete removal would take a "considerable amount of time."

St. Amant (1973) says that under field conditions, oily tastes generally occur in oysters when the substrate exceeds 500 ppm of hydrocarbon. He says that if the oysters are removed to unpolluted areas and allowed several months of depuration 1/, they will eventually purge themselves of oil to a point where noxious tastes are not detectable.

Scarrot (1971) has found that commercial species of scallops ingested spilled Bunker C oil. Subsequent chemical analysis revealed the

1/ Depuration: The process whereby a contaminated shellfish partially eliminates hydrocarbons from its system through continued exposure to clean water.

presence of Bunker C in the mantle, digestive gland, adductor mussel, and gonad.

Studies on the effects of petroleum hydrocarbons on shrimp are few. St. Amant (1973) refers to a concentration of oil of 10 ppt as being lethal to these organisms. He adds, however, that to reach this concentration under field conditions, more than 3,000 gallons of oil per acre foot of water would be required to meet the concentration. This concentration is rarely acquired except in the immediate area of a spill. St. Amant (1973) refers to Sanson (1973) who projects that in order to attain a concentration of 10 ppt of oil pollution in two of Louisiana's lakes containing 5,100,000 acre/feet of water, 15 billion gallons of oil would be needed. He claims that this is five times the rate of pollution for all the world's oceans (St. Amant, 1973).

In summary, commercially important shellfish accumulate petroleum hydrocarbons in areas of oil spills. Consumption of oysters under these conditions would introduce hydrocarbons to higher levels of the food chain. Thus state regulation of shellfish beds is important. Authors disagree on the amount of time necessary for an oyster or shellfish to cleanse itself. Estimates vary from several months to with complete depuration to six months with no depuration.

Finfish

Although fish are able to swim away from an oil spill area, they still receive some amount of contamination.

One example is given by Connel (1971) stating that the Australian mullet had a kerosene-like tainting due to the presence of kerosene-like hydrocarbons in the flesh. He found the contaminated compounds to be similar to substances isolated from river sediments. The river used by the mullet flows alongside oil refineries and associated storage and wharf facilities. Volatile hydrocarbons were found in the water adjacent to petroleum storage facilities and also in the river's estuary near a sewage fallout.

In addition, R.C. Clark (1973) cites the work of Shipton, et al. (1970) and Vale, et al. (1970) concerning the same subject--kerosene-like tainted Australian mullets. Shipton, through gas chromatography and spectral analysis says the isolated kerosene appears to be similar to a commercial sample of kerosene. Liver examination by optical and electron microscopes revealed higher amounts of free fat than untainted samples (Vale, 1970). This condition in higher animals can be caused by petroleum distillates (British term "benzine", Browning, 1953).

Sea-trout and plaice were found to be tainted according to taste test. These fish were caught after the Torrey Canyon incident involving the spillage of Kuwait crude oil. No chemical analysis by chemical class was reported (R. C. Clark, 1973).

Following the West Falmouth spill of September 1969, a series of sampling stations were set up for monitoring. Ten months later the first species, except for the polychaete, Capitella, were reported as returning. Among these were small flounders and killifish (Sanders, 1973).

Fish not only receive differing amounts of pollution from the water itself but through the contaminated food they eat. Blumer (1973) as stated by R. C. Clark (1973) said the hydrocarbons contained in the zooplankton upon which the basking shark fed, had passed through the digestive tract without fractionation or structural modification. These hydrocarbons were deposited in the shark's liver.

Also to be considered are the effects of oil on developing fish. Ketchum (1973) refers to Mironov's work in 1967 stating there was 100% mortality in developing flounder spawn at concentrations ranging from 1 to 100 ppm of three types of oils. There was also an increase in abnormal development following longer periods of exposure to concentrations as low as 0.01 ppm.

Despite the fact that finfish do receive contamination from the waters around them, the Louisiana fisheries statistics support the fact that there is an increase in the catch. (See Sec. II. G.) Supporting this, Mertens (1973) refers to Oppenheimer's testimony in New Orleans on Outer Continental Shelf Environmental Impact Statement Hearing, August, 1972. "Despite the presence of the oil industry in this area, the

fishing catch has risen markedly in that period and presently is greater than any other fishery in the United States." Also referenced in Mertens' article is St. Amant's comment. He expresses a similar conclusion insofar as offshore operations are concerned but cautions that operations on marshlands may have some effect.

E. Impact on Air and Water Quality

1. Impact on Air Quality

The quality of air over the sale area could be degraded by exhaust emissions of stationary power units and service vessels, and by the accidental release of oil and gas from wild wells.

The impact of exhaust emissions is unknown, but thought to be small and unimportant.

According to one authority 1/ the average composition of natural gas as delivered to pipelines in the U.S. is:

Methane	CH ₄	72.3%
Ethane	C ₂ H ₆	14.4%
Carbon dioxide	CO ₂	0.5%
Nitrogen	N ₂	12.8%

(Small amounts of sulphur and other materials could also be present in some localities.)

If a wild well were not burning, obviously, the above gases would simply be released into the air. If the gas well was on fire, combustion would be essentially complete and the emissions would consist almost entirely of carbon dioxide (CO₂) and water; the nitrogen would remain as N₂ and any sulfurous gases would be oxidized to SO₂. The resulting impact would not be great.

If a wild well were releasing crude oil into the water, the resulting impact would be substantially greater. If the oil does not burn,

1/ Henry A. Ley, "Natural Gas", in Geology of Natural Gas, Amer. Assoc. Petrol. Geol., Tulsa, Okla., (1935) pp. 1073-1149. As cited by Levorsen (1958).

a significant amount of it will evaporate. During the Chevron, 1970 spill it was estimated that 15% of the roughly 30,000 bbl. spilled evaporated. At an average density of 310 lb./bbl., this incident would have introduced almost 14,000 lb. of hydrocarbons into the air. Some oil spills in the past have resulted in fires.

A reasonable estimate of the range of emissions, assuming complete combustion, that an oil well fire could produce per 1,000 bbl. burned, might be as follows: 1/

CO ₂	:	340,000-347,000 lb.
SO ₂	:	620- 34,000 lb. <u>2/</u>
NO	:	660- 10,000 lb.

(As a point of reference, during the Chevron - 1970 fire and spill, the maximum spillage rate was estimated to be 1,000 bbl. per day.)

Combustion of oil would in reality be incomplete, however, and emission would contain somewhat less of the above compounds, but would include, in addition, such materials as volatilized petroleum, particulate carbon, carbon monoxide, nitrous oxide, sulphur monoxide, along with other altered or partially oxidized matter. There is no reliable way to predict in advance the relative volumes of each of these possible emissions because it would depend, among other things, upon moisture

1/ Values used in calculation are based on world averages for crude oil of 310 lb/bbl.; Percent content of weight is: carbon 82.2 to 87.1, sulfur - 0.1 to 5.5 nitrogen - 0.1 to 1.5 (Levorsen, 1958).

2/ SO₂ emission would be less for Gulf of Mexico crudes, which range from 0.1 to 0.5% sulfur.

content of the air, wind speed, pattern of oil spray from wild wells, number of wells involved, chemical content and physical character of the oil itself, and types of equipment and materials other than oil that might also burn.

Massive spills from wild wells are not the only source of spilled oil. Information presented in section III. B. 2. demonstrates that over 1,800 bbl. were spilled in 1973 as the result of almost 1400 minor spills. The net result is that a small amount of spilled oil is floating somewhere on the waters of the northwestern Gulf almost continually. Concern has been expressed 1/ that the evaporation of this spilled oil may be the cause of the substantial levels of hydrocarbons which have been detected in the sea breeze coming off the Gulf. Preliminary surveys 2/ indicate that the content of reactive (smog-producing) hydrocarbons in the sea breeze between Corpus Christi and Port Arthur are at a level three times higher than the national average. At the present time there is no hard evidence as to the source of these materials.

At this time, we are unable to predict the degree of deterioration in air quality that will occur because of this proposed sale.

1/ Personal communication with Mr. Kenneth Ports. Texas Air Pollution Control Service.

2/ Ibid.

2. Impact on Water Quality

The natural condition of sea water may be altered and degraded in several ways during oil and gas operations.

Debris and bilge will be released into Gulf waters from the many seismic vessels, crew boats, tugs, and service and supply boats used throughout the operation. No estimate can be made of the quantities involved. They should be similar to amounts released off all types of vessels nationwide.

During drilling operations, drilling fluids and drill cuttings will be discharged into the sea. Most drill cuttings in the Gulf consist of sand and shales and therefore cause no turbidity, but settle to the bottom quite rapidly, on the order of minutes. The drill cuttings are washed prior to disposal.

It has been estimated that 2,445 barrels of cuttings and several tons of turbidity-producing mud compounds are discharged overboard during the course of drilling an average 10,000 foot well.

The production and discharge of formation waters (oil-field brines) has been discussed earlier (section III.A.3.c). Three components or properties of formation waters contribute to water quality degradation when released into the sea. One is the small amount of entrained liquid hydrocarbon. There are some locations disposing of formation water where the treatment equipment puts out an effluent with less than 25 ppm oil content, but the facts also show that this control

is not being accomplished across the board on a continuing basis. Many other locations only manage to meet the requirements of OCS Order No. 8, releasing waters with entrained oil averaging less than 50 ppm. The second property of formation water that degrades water quality is its high concentration of dissolved mineral salts. This value ranged from 61,552 mg/l to 270,400 mg/l in 76 samples from the OCS off Louisiana. This contrasts sharply to the average sea water salinity of 35,000 mg/l. The third degrading property results from the fact that formation waters are devoid of dissolved oxygen. Current production of formation waters from all Louisiana OCS operations is 605,000 bbl/day; 305 bbl/day is transported to shore.

Water quality could be further degraded as the result of accidental oil spills. It is estimated that, based on the 1971-73 rate of oil spillage, 500-900 bbl. per year could be spilled from tracts included in this sale. Based on data gathered from 1964 through 1973, most of which predates implementation of the OCS operating orders, the projected rate of spillage from tracts included in this sale could be as high as 3,000 to 5,250 bbl./year.

In addition, a few hundred bbl. per year will likely be released through minor spillage. Part of this spilled oil would be removed by clean-up operations and some would evaporate, but the largest proportion would probably be dispersed into the waters of the Gulf.

Another source of water quality degradation is the resuspension of sediment during pipeline construction and burial. This operation was discussed in section III.A.4. The jetting away of the substrate from beneath the pipeline will result in creating a plume of turbidity trailing away from the operations in the direction of the current. The plume can reach proportions of several yards wide and hundreds of yards long if the substrate is exceptionally muddy. The duration appears to be on the order of several hours at a given location.

Water quality in some areas of Louisiana is affected by effluents from oil refineries and petrochemical plants. Although production from this sale will not require an expansion of refinery capacity in the area, it will be refined in the area along with production from other non-OCS sources. In this manner, production from this sale will contribute to the continuation of refining activity in the region and its resultant effects on water quality. Effluent discharges from these refineries and petrochemical plants must meet existing local, State, and Federal anti-pollution standards.

F. Conflict with Ship Traffic and Navigation

In seas adjacent to the United States, including the Gulf of Mexico, safety fairways have been established for the safe passage of vessels enroute to, or from, U.S. ports. However, an unknown number of ships do not use these fairways, greatly increasing the possibility for a collision with drilling rigs, permanent platforms, and their attendant vessels. Impacts which could result include loss of human life, spill of oil, release of debris including part of, or the entire drilling rigs, and the ship, if it sinks. The contents of the ship's cargo could pose a serious threat to the environment if it includes toxic materials such as chemicals, crude oil, or refinery products. Statistics on ship-platform collisions were given in section IV.A.2.d. In addition, current Coast Guard regulations concerning lighting and fog alarms on structures are summarized in Attachment M.

Floating trash accidentally lost off platforms also constitutes a hazard to boats. Damaging collisions can result between small fast boats and floating drums, cans, and wood. The screws of all sizes of motor boats and vessels can be fouled on floating plastic sheeting and plastic or nylon ropes. The extent of this problem is unknown. All oil production from this proposed sale will be moved ashore via pipelines.

G. Conflict with Military Uses of the Continental Shelf

The Gulf of Mexico is used rather extensively by the Navy and Air Force for conducting military training and research operations. These current activities consist of missile testing, ordnance testing, drone recovery operations, and electronic counter measure (ECM) activities by the Air Force. Mine research activities are conducted by the Department of the Navy. Most of this activity takes place in areas designated for these purposes. However, live ordnance testing by the Air Force occasionally involves emergency release of ordnance outside designated bombing areas. These ordnances range from small munitions to 1200-pound bombs. The possibility of occurrence of unexploded munitions on the ocean floor in the proposed lease sale is extremely remote.

H. Impact on Recreational, Historical and Archeological, Aesthetic, and Conservation Resources

1. Beach and Shoreline Recreation

Recreation activities in beach and shoreline areas can receive impacts from pipeline construction onshore, from oil spills, and from the placement of onshore facilities, such as production terminals or transfer facilities, should they be located in or near a recreation area.

There is a possibility that one new pipeline may be brought ashore as a result of this sale. If it crosses a beach area used for recreation there will be an impact. The area of beach disturbed by pipeline construction would be fairly small (30 feet wide) and the first high tides following burial of the pipeline would serve to restore the beach terrain. Restoration of the beach ridge would take longer, most likely requiring a storm tide or high winds to obliterate the effects of excavation. Physical interference, then, with recreational activities will be minimal and short-lived.

If production terminal or transfer facilities are located in or near a beach or other area used for recreation, there will be an adverse impact from disruption during the construction phase and elimination of anywhere from 20 to 100 acres per terminal plant for recreational uses. This latter impact would be long-term and restoration of the area, if attempted at all, would have to await depletion of the offshore production which the plant would be designed to serve. These

impacts may tend to diminish quality of the area for recreational enjoyment.

Water sports, such as swimming, diving, spearfishing, underwater photography, fishing for finfish and shellfish, boating and water skiing would also be directly affected by an oil spill.

Other marine related activities such as beachcombing, shell collecting, painting, shoreline nature study, camping and sunbathing would be made much less attractive for an indeterminate period where an oil spill had coated a beach.

Removal of oil from beaches used for recreation in the area under consideration would probably involve removal of the contaminated sand and possibly, replacement of the sand if needed. The time period for clean-up in this case would depend on the extent of beach affected. Recreational use of the area would be precluded during the time that oil covered the beach and during the clean-up process also.

The impacts of an oil spill discussed above would be more keenly felt if the recreation area involved is intensively used or considered to have unique or outstanding recreational values such as many of the popular recreation areas along the eastern Gulf coast. Not only would the impact be felt by the recreational users of the area, but, consequently, the community or businesses whose economic well-being depends on use of their recreational resources by tourists would be affected. If an oil spill were to cover outstanding recreational beaches during

the height of the recreational season, the impact could be expected to be more severe, in that residents and tourists would not be attracted to a beach area contaminated by oil or undergoing a clean-up process, and there would be a resultant economic loss.

2. Aesthetic and Scenic Values

If air quality permits unlimited visibility, some portion of a one hundred foot structure can be seen from the beach if it is located 17 miles or less from shore. Some people consider the sight of offshore equipment aesthetically unpleasant. Seventy-six of the 295 tracts included in this proposal are located at distances varying from 4 to 17 miles from shore. The shore in this case being that shoreward of West Cameron, East Cameron, Vermillion, South Marsh Island North Addition, Eugene Island, Ship Shoal, South Timbalier, West Delta, South Pass, South Pass-South and East Addition, Main Pass, Main Pass-South and East Addition, and Mobile South No. 2 areas.

It is likely that some structures resulting from this sale will be visible from the recreational beach areas in western Louisiana, Isles Dernieres, Grand Isle, and Breton, Delta, Pass a Loutre, Wisner, Marsh Island, Paul J. Rainey, and Rockefeller wildlife refuges or management areas. The visibility of these structures may be considered to be an adverse impact on the aesthetic values these areas by some.

Any floating material such as debris or oil that is cast up on the beach or washed into a bay would constitute an impact upon the aesthetic values for users or owners of the area.

Even after burial of a pipeline, the scars will cause an impact on the aesthetic values of the beach and associated dunes and sand flats. It is our estimation that the impact will endure for at least a year, until sand has been redistributed by wind, tides, and rain, and another growing season brings about revegetation.

Revegetation of dunes crossed by pipelines would reduce adverse effects from an aesthetic and scenic viewpoint and would decrease the chance of destruction of the dunes by erosion. It is not, however, within the Federal Government's authority to require the revegetation of affected dunes unless they are on Federal lands. State or local authorities may require revegetation of dunes disrupted by pipeline installations.

In marsh areas where it is impossible to backfill canals or ditches because of the unconsolidated nature of the substrate, there will be an adverse impact on aesthetic values if any pipelines are constructed. The laying of a pipeline in these areas would result in an open canal or ditch through the marsh. However, this would be an add-on effect since there are at present numerous canals or ditches of this sort.

There will be an adverse impact on aesthetic and scenic values resulting from construction of onshore terminal and product storage facilities, and pumping stations if these facilities are located in areas valued for their natural or scenic qualities. Some people will find the visual impact of these facilities aesthetically displeasing. There also may be noise pollution associated with vehicular traffic to, and from, these facilities and noise pollution resulting from pumping stations

that would reduce the serene and natural qualities of an aesthetically enjoyable area.

3. Historical or Archeological Sites and Objects

Impacts on these could stem from two sources. During an oil spill, any objects coated with oil would obviously be rendered less useful and valuable and may not survive cleaning operations. In addition, porous items such as wood, pottery, or shell may be internally contaminated with oil and this might interfere with carbon dating procedures.

During pipeline burial operations or construction of terminal, storage, or pumping facilities, as yet undiscovered archeological sites or objects and shipwrecks may be damaged or destroyed. Normal pipeline route survey procedures usually include a magnetometer survey. In this way, all larger ferrous objects, including objects of historic or archeological value, are detected and avoided or investigated prior to actual laying operations. This survey would not reveal the presence of non-ferrous objects, however. Therefore, it is likely that sites containing archeological evidence of cultures which did not make use of metal, i.e., the older, less well-known cultures, would not be detected by this method.

Special surveys of onshore facility site locations and pipeline routes would have to be taken before any assurance that sites and objects of historical or archeological interest might not be destroyed or damaged.

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Pipeline burial operations have the potential for damage or accidental destruction of as yet undiscovered sites which may be important to the understanding of prehistoric inhabitants of the area. The scope of the impact, and its probability of occurrence, is not possible to determine at this time. The impact may be mitigated to some degree if the appropriate state authorities are consulted as to the exact locations of known archeological sites or potential locations for undiscovered sites before any construction or pipeline burial is undertaken. See Section IV. D. 1. for a stipulation which will be applied to any lease resulting from this proposed sale for the protection of archeological, architectural, or historical values.

4. Conservation Resources

Included under this heading are the state and Federal wildlife refuges and management areas, aquatic preserves, natural landmarks and any other areas formally set aside for conservation of their natural values. There are a number of areas of this type adjacent to the coastline of Louisiana (Vol. 1, Sect. II. G. 2.).

The impacts of oil spills and pipeline and onshore facility construction on biota, air and water quality, beaches, etc., have been discussed previously. Should an oil spill occur in a conservation area, or should pipeline and onshore facility construction occur in one of these areas, the impacts discussed above will apply. In the event that impacts discussed previously do occur in a conservation area,

the impact will not only be on the air and water quality, beaches, biota, etc., the impact will also be on the effort to preserve or protect a unique, representative or otherwise significant natural value.

In addition, any adverse impact on biota in these areas may be considered particularly severe in that these areas are reserved specifically for the preservation or management of wildlife species, some of which are considered endangered or threatened.

5. Sport Fishing and Recreational Boating

Although we have no conclusive evidence, it is our opinion that a major oil spill would affect fishing adversely. Boat fishermen would not want to soil their boats by fishing in the vicinity of an oil slick and neither boat nor surf fishermen would want to keep fish that had been coated or contaminated with oil. Therefore, sport fishing would be curtailed in the vicinity and for the duration of the spill incident. From the standpoint of intensity of use by fishermen, an oil spill's impact on sport fishing would be felt most severely in Sub-basins I and IV (see Sect. II.G.2.).

We have received extensive testimony and evidence that overall, oil and gas operations have a favorable impact on sport fishing activities. The favorable impact is the result of sports fish population enhancement due to the artificial reef effect of offshore platforms. In the open sea, offshore platforms provide both food and cover in areas that

are largely devoid of these essentials. Myriad forms of micro-organisms in the water drift by these structures and attach themselves, soon encrusting all exposed surfaces on the platform. The average platform in 150 feet of water provides 90,000 square feet of hard surface for encrusting organisms. 1/ Hard substrate is necessary for encrusting organisms such as barnacles, corals, mussels, hydroids, and other invertebrate organisms which serve as links in the food chain. Randall (1963) has stated that artificial reefs provide protection, food sources, spawning sites, and spatial orientation markers for fishes. The same author found that artificial reefs attract available fish from surrounding waters, and increase the size of some populations by providing additional protected areas and food for both young and adults.

It has been suggested (Bureau of Outdoor Recreation comments on a previous draft statement) that minor design modifications on fabricated rig structures be added to facilitate sport fishing and scuba diving.

Recreational boating not involving sport fishing would also be adversely affected by an oil spill. Persons desiring to use their boats for sightseeing or travelling would not wish to soil their boats in an oil slick. Should a slick come ashore in a marina, there would be an economic loss involved in the cleanup of boats and dock facilities.

6. Impact on Endangered and Threatened Wildlife

There are numerous species of endangered and threatened animals shoreward of the proposed sale area. There are several reasons for species becoming endangered or threatened; prominent among these reasons is the loss of suitable habitat; although overhunting has also been a cause. Any activity resulting from this proposed sale which would further limit the suitable habitat for an endangered or threatened species would increase the danger to its survival. It is also possible, of course, that an oil spill could affect an endangered or threatened species if it were to occur in its habitat, which would further endanger the survival of the species.

The following Table (Table 5) lists the species which are listed in the publication Threatened Wildlife of the United States, Resource Publication 114. This list was compiled by the Office of Endangered Species and International Activities, Bureau of Sport Fisheries and Wildlife.

These animals are either threatened, peripheral, or status-undetermined. Threatened refers to threatened with extinction. A peripheral species or subspecies is one whose occurrence in the United States is at the edge of its natural range and which is threatened with extinction within the United States although not

in its range as a whole. Special attention is necessary to assure retention in our Nation's fauna.

A status-undetermined species or subspecies is one that has been suggested as possibly threatened with extinction but about which there is not enough information to determine its status.

TABLE 5

THREATENED, PERIPHERAL, OR STATUS--UNDETERMINED SPECIES
WITHIN THE PROPOSED AREA

Threatened Amphibians and Reptiles

American Alligator	<u>Alligator mississippiensis</u>
Green Turtle	<u>Chelonia mydas</u>

Threatened Birds

Eastern Brown Pelican	<u>Pelecanus occidentalis carolinensis</u>
Southern Bald Eagle	<u>Haliaeetus leucocephalus leucocephalus</u>
Arctic Peregrine Falcon	<u>Falco peregrinus tundrius</u>
American Ivory-Billed Woodpecker	<u>Campephilus principalis principalis</u>

Threatened Mammals

Sperm Whale	<u>Physeter catodon</u>
Blue Whale	<u>Balaenoptera musculus</u>
Finback Whale	<u>Balaenoptera physalus</u>
Sei Whale	<u>Balaenoptera borealis</u>
Humpback Whale	<u>Megoptera novaeangliae</u>
Red Wolf	<u>Canis rufus</u>

Peripheral Birds

Roseate Spoonbill	<u>Ajaia ajaja</u>
Wood Ibis	<u>Mycteria americana</u>
Eastern Pigeon Hawk	<u>Falco columbarius columbarius</u>
Western Snowy Plover	<u>Charadrius alexandrinus nivosus</u>
Northern Long-Billed Curlew	<u>Mumenius americanus parvus</u>

Status--Undetermined Mammals

Louisiana Vole	<u>Microtus ludovicianus</u>
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I. Secondary Impacts

1. Induced Industrialization in the Coastal Zone

Large petroleum-related industries are already well established in Louisiana and Texas. Production platforms, exploratory rigs, pipeline construction equipment, and other equipment, both new and used, needed for development in this proposed sale are expected to come from these areas. Likewise, existing refinery capacity in Louisiana and Texas will be used for processing production expected from the proposed OCS sale #36.

There are three possible results from this sale:

- (1) Production from this sale will offset in full or in part declining production from onshore and offshore areas.
- (2) Production from this sale will enable an equivalent reduction of oil imports.
- (3) Production from this sale will require an expansion of existing refinery capacity.

There is no way of predicting at this time which of the above three events will occur. Possibility (1), however, seems the most likely to occur given the estimated daily production anticipated as a result of Louisiana OCS sale #36. Possibilities numbers (1) and (2) would not increase present levels of environmental impacts

associated with existing refineries. Possibility number (3), however, would have an incremental, add-on environmental impact as a result of an increase in refinery capacity and throughput. This would result in additional increments of sources of air and water pollution. Additional but unknown quantities of particulate, SO_x , NO_x , hydrocarbon, aldehyde and ammonia emissions would result from increased refinery throughput. Also, additional increments of water pollution from refineries discharging waste water could result. Such pollutants as suspended solids, total dissolved solids, oil, ammonia, chromium, phenol, sulfides and increased BOD and COD would result from increased refinery capacity. It is not possible at this time to quantify the add-on increases of air and water pollutants. In any event, all emissions and pollutants would have to be within levels required by appropriate State or Federal standards.

A number of support facilities and activities will be required as a result of this proposed sale. Some of these are identified below.

(1) Production, Storage and Pumping Transfer Terminals

According to Geological Survey estimates production from this sale will require from zero to five new terminals and as many as two new storage facilities. Preliminary estimates from

industry indicate that should rapid development of tracts offered in the previous OCS oil and gas lease sale offshore Louisiana and this proposed sale occur, there may be a need for one new pipeline to come ashore resulting in one new terminal facility. However, according to industry, it is quite possible that existing facilities will be able to handle production from this sale.

These terminals serve as collecting points for oil which is brought to shore by pipelines. Oil that has not been treated on the production platform is treated to remove sludge and sand and to separate, treat and dispose of associated waste water. Terminals of this type usually range from 30,000 to 100,000 bbl./day capacity and have a 2 to 3 day production storage capacity. They may occupy from 20 to 40 acres of land depending on the amount of production they process each day. If the oil is to be transported to a refinery by pipeline then a pumping transfer facility may be required. A pumping transfer facility may serve as a receiving point for one or more intermediate production terminals. It will usually have a 4-5 day production storage capacity with storage tanks ranging in size from 50,000 to 200,000 bbl. each depending on production levels and number of producing terminals which it serves. Large pumps are used to move the oil from the transfer facility to refineries by pipeline.

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(2) Support Facilities and Activities

It is estimated that oil field supply companies who provide necessary field equipment for both drilling and producing operations would use established storage and warehouse facilities at strategic locations as a result of this proposed sale. It could be expected, based on past experience, that utilization of existing facilities on short-term leases (i.e., 3-5 years) in already developed areas would be undertaken wherever possible. Each additional storage or warehouse facility would occupy from 3 to 4 acres.

The environmental effects associated with onshore support facilities are not likely to increase as a result of this proposed sale.

Industry representatives have indicated that every effort will be made to locate any additional facilities in areas of existing industrial development, to utilize existing wharf facilities, and in general to locate in areas where access to land, sea and air facilities are presently available for industrial purposes. All onshore developments resulting from this proposed sale, where appropriate State or local government regulations apply, will be subject to those regulations and standards.

2. Economic Effects

Offshore production resulting from OCS sales historically has resulted in the need for increased onshore facilities for the transporting, storing and processing of gas and crude oil, as well as for ancillary petrochemical industries. The direct and indirect, primary and secondary socio-economic stresses, impacts and responses, both long-term and short-term, are often highly sensitive to specific areas of production and levels of production, and have involved a significant portion of the impact consideration.

Throughout this statement, an assumption has been used as the basis for assessing the impact on the "natural" environment. For consistency, the "socio-economic" impacts will be based on the same assumption (i.e., that offshore production resulting from this sale will be transported to existing refinery facilities in Louisiana, or in Texas, or transported through intermediate facilities to these same refineries. This assumption permits the conclusion that onshore sensitivity or impact, will be a function of utilizing or expanding an existing infrastructure.

Historically, the Gulf coast has been a surplus producer of crude oil and petroleum products. This surplus has been shipped to other regions in the U.S. to meet their demands. Production records for the Federal OCS operations along the Gulf coast indicate that production began declining in the summer of 1972. The production resulting from this sale probably will serve to maintain existing levels of offshore produc-

tion, rather than act as an increment. Therefore, the production from this sale, in itself, will not introduce a significantly greater magnitude, or new type of socio-economic impact or stress for much of the onshore areas directly landward of the proposed production areas.

The OBERS projections (Attachment G) show only slight increases in employment for the petroleum and related industries for all BEA Economic Areas possibly affected by the La. #36 sale. The earnings for the industry, however, are disproportionately greater than the increases in employment because of the greatly increased input per employee anticipated between 1970 and 2020.

This greatly increased refinery capacity and output for the entire Gulf in the face of a projected near term peak, and then decrease in the offshore supply, implies the processing of crude oil imported into the area. The impact of this sale cannot be treated in isolation from such externalities, i.e., other projects which have parallel socio-economic impacts. Of special significance is the potential importation of crude oil for processing in the Gulf region, as supported by the following excerpt: ". . . current demands placed on the region by P.A.D. Districts I and II have increased total demands for District III (The Gulf Coast) crude oil products to the point where importation of foreign crude oil has become necessary to supplement domestic production. Assuming District III is to continue supplying crude oil and products to these regions and continue meeting

its own needs, foreign crude oil imports are projected to reach approximately 3,500,000 bcd in 1980, and 11,400,000 bcd in 2000. The coastal refinery capacity is projected to increase from the present 4,818,000 bcd to approximately 9,062,000 bcd and 15,175,000 bcd in 1980 and 2000, respectively." 1/

The socio-economic impacts of this sale will relate most significantly to the location and magnitude of the refining industry and the chemical and allied products industries. It will also relate, but less significantly because of the smaller magnitude of development, to the requirements for other various onshore support facilities.

Given the two assumptions stated previously (that offshore production from this sale would be transported directly to existing refineries in Louisiana, or Texas, or transshipped through terminal facilities to these refineries), it is likely that BEA Economic Areas 138, 139, New Orleans and Lake Charles Louisiana will be the primary areas to be effected. It is also possible BEA Area 140 (Beaumont-Port Arthur-Orange, Texas) and 141 (Houston, Texas) could be effected.

The onshore response to any developmental pressures, either from this sale or other externalities, or both in combination, is presently the function of State and local policies regarding economic development

1/ Unpublished report prepared by the Dept. of the Army, Lower Mississippi Valley Division, Corps of Engineers, Vicksburg, Miss., entitled "Report on Deepwater Port Facilities, Texas, Louisiana, Mississippi, Alabama, and Florida".

and land use. The brunt of economic impact will be felt almost entirely by Louisiana as a result of this sale. Some economic impact may extend as far West as Houston (Attachment G) although the impact would not be sufficient to warrant detailed examination.

The economic impact on Louisiana of holding LA. #36 sale is not as significant as the adverse impact of not holding the sale. Over 20% of the total wages earned by Louisiana citizens falls within the following three categories. 1/

CATEGORY I
(Mining)

Jobs which exist only to the extent that oil and gas exploration and production occurs in Louisiana.

As of June, 1972 there were 47,800 persons employed in the mining of oil and gas in Louisiana, with average earnings of \$10,400. The annual payroll approximates \$500,000,000, which represents over 6% of all Louisiana wages and salaries.

CATEGORY II
(Manufacturing Feed Stock)

Manufacturing operations which depend upon oil and gas as a feed stock. While this feed stock could be imported from other areas, the increased transportation cost would reduce Louisiana's ability to compete with other facilities located close to the marketplace or the oil and/or gas supply.

1/ Prepared by the Research Division, Louisiana Dept. of Commerce and Industry.

<u>No. Workers</u>	<u>Product</u>	<u>Earnings*</u>	<u>Annual Payroll</u>
10,375	Industrial organic chemicals	\$10,946	\$113,546,750
3,312	Plastic materials & Synthetics	10,946	36,253,152
1,197	Carbon black	10,946	13,102,362
9,700	Petroleum refining	11,778	114,246,600
<u>1,574</u>	Oil field machinery	7,750	<u>12,198,500</u>
26,158	*Average Annual Earnings		\$289,365,364

This category accounts for 4% of the total wages and salaries paid in Louisiana.

CATEGORY III
(Oil and Gas Markets)

Industries which depend upon the Louisiana oil and gas industry to buy all or part of their goods and/or services.

Any reduction in Louisiana oil and gas activity can be expected to significantly affect these industries.

<u>No. Workers</u>	<u>Industry</u>	<u>Earnings*</u>	<u>Annual Payroll</u>
61,300	Transportation	\$ 8,445 (est)	\$517,678,500
19,300	Manufacturing & Repairing transportation equipment	8,432	161,894,400
9,800	Fabricated metal products manufacturing	8,315	81,487,000
14,272	Wholesale trade machinery equipment and supplies	8-9,000	<u>125,000,000</u>
<u>104,672</u>			\$886,059,900

This category accounts for 11% of the total wages and salaries paid in Louisiana.

Thus, over 20% of the total wages earned by Louisiana citizens fall within these categories of total or heavy dependence upon the oil and gas industry.

NOTE: No attempt was made to assess the indirect impact on retail sales services, State and local taxes, etc.

Apart from state statistics as a whole, attention should be paid to the economic importance of the oil and gas industry to coastal Louisiana parishes.

Within the United States there is an average ratio of thirty manufacturing jobs for each mining job.

Coastal Louisiana during the years of unrestricted development of offshore oil and gas has become quite dependent upon mining as its primary industry, as illustrated by the following statistics: 1/

<u>Parish</u>	<u>Mining No. Employed</u>	<u>Manufacturing No. Employed</u>
Cameron	1,331	236
Iberia	1,949	1,780
Lafayette	5,575	2,000
Lafourche	1,070	1,689
Plaquemines	4,866	925
St. Mary	3,414	2,804

1/ Prepared by the Research Division, Louisiana Department of Commerce and Industry.

<u>Parish</u>	<u>Mining No. Employed</u>	<u>Manufacturing No. Employed</u>
Terrebonne	3,560	2,805
Vermilion	<u>1,023</u> 22,788	<u>693</u> 12,932

Over 40% of the mining jobs in Louisiana are concentrated in the eight coastal parishes listed above.

In a similar study on the economic impact of the Louisiana offshore oil industry on the State of Louisiana by the American Petroleum Institute (1971), the following results were presented.

SUMMARY OF RESULTS 1/

1. People directly and indirectly employed as a result of the existence of the offshore oil industry.
 - a. Direct
 - i. Number 38,000
 - ii. Annual Income \$381,000,000
 - b. Indirect
 - i. Number 76,000
 - ii. Annual Income \$418,000,000
2. Capital expended to find, develop, produce transport and process offshore oil and gas.
 - a. Period 1948-1971 \$9,390,000,000
 - b. 1971 807,000,000
3. Capital expended which stayed within the State of Louisiana to find, develop, produce, transport and process offshore oil and gas.
 - a. Period 1948-1971 \$5,500,000,000
 - b. 1971 482,000,000

1/ For a detailed description of the approach and details of development of data see "Study: The Economic Impact of the Louisiana Offshore Oil Industry on the State of Louisiana." American Petroleum Institute, Committees on Exploration, Subcommittee on Production.

4. Operating and maintenance expenses for producing, transporting and processing offshore oil and gas.
 - a. Period 1948-1971 \$2,600,000,000
 - b. 1971 376,000,000
5. Operating and maintenance expenses which stayed within the State of Louisiana for producing, transporting, and processing offshore oil and gas.
 - a. Period 1948-1971 \$2,080,000,000
 - b. 1971 301,000,000
6. Cumulative industry direct impact on the economy of Louisiana (3 plus 5).
 - a. Period 1948-1971 \$7,580,000,000
 - b. 1971 783,000,000
7. Louisiana payroll from indirect employment as a result of offshore oil industry. (See 1 above)
 - a. Period 1948-1971 \$4,020,000,000
 - b. 1971 418,000,000
8. Total direct and indirect impact of offshore oil industry on State of Louisiana. (6 plus 7)
 - a. Period 1948-1971 \$11,600,000,000
 - b. 1971 1,201,000,000

SUMMARY OF ESTIMATES

1. Total oil and gas producing company personnel employed in the Louisiana oil and gas offshore industry

8,000
2. Annual payroll for these 8,000 people.

\$96,000,000
3. Total oil and gas service personnel directly employed in the Louisiana oil and gas offshore industry.

30,000

4. Annual payroll for these 30,000 people.

\$285,000,000

5. Total personnel employed as an indirect effect of the 38,000 identified industry employees.

76,000

6. Annual payroll of these 76,000 people.

\$418,000,000

7. Total Louisiana employment contributed by Louisiana offshore oil industry.

114,000

8. Total annual payroll of these 114,000 people.

\$799,000,000

9. Capital expenditures by the oil and gas producing companies offshore Louisiana.

a. Cumulative (1948-1971) \$8,000,000,000

b. 1971 774,000,000

c. Portion of cumulative expenditures which stayed in Louisiana 4,800,000,000

d. Portion of 1971 expenditures which stayed in Louisiana 464,000,000

10. Oil and gas producing companies Louisiana offshore operating and maintenance expenses.

a. Cumulative (1948-1971) \$2,370,000,000

b. 1971 356,000,000

c. Portion of cumulative expenses which stayed in Louisiana 1,900,000,000

d. Portion of 1971 expenses which stayed in Louisiana 285,000,000

11. Capital expenditures by oil and gas pipeline companies offshore Louisiana.

a. Cumulative (1948-1971)	<u>\$850,000,000</u>
b. 1971	<u>23,000,000</u>
c. Portion of cumulative expenditures which stayed in Louisiana	<u>510,000,000</u>
d. Portion of 1971 expenditures which stayed in Louisiana	<u>14,000,000</u>

12. Operating expenses of oil and gas pipeline companies offshore Louisiana.

a. Cumulative (1948-1971)	<u>\$94,000,000</u>
b. 1971	<u>6,300,000</u>
c. Portion of cumulative expenses which stayed in Louisiana	<u>75,000,000</u>
d. Portion of 1971 expenses which stayed in Louisiana	<u>5,000,000</u>

13. Capital expenditures by oil and gas pipeline companies onshore to export gas and crude from Louisiana.

a. Cumulative (1948-1971)	<u>\$400,000,000</u>
b. Portion of cumulative expenditures which stayed in Louisiana	<u>140,000,000</u>

14. Operating expenses by oil and gas pipeline companies onshore to export gas and crude from Louisiana.

a. Cumulative (1948-1971)	<u>\$86,000,000</u>
b. 1971	<u>5,800,000</u>
c. Portion of cumulative expenses which stayed in Louisiana	<u>70,000,000</u>
d. Portion of 1971 expenses which stayed in Louisiana	<u>4,600,000</u>

15. Capital expenditures for natural gas processing plants to process offshore gas.

a. Cumulative (1948-1971)	<u>\$140,000,000</u>
b. 1971	<u>10,000,000</u>
c. Portion of cumulative expenditures which stayed in La.	<u>50,000,000</u>
d. Portion of 1971 expenditures which stayed in Louisiana	<u>4,000,000</u>

16. Operating expenses for natural gas processing plants which process offshore gas.

a. Cumulative (1948-1971)	<u>\$50,000,000</u>
b. 1971	<u>8,000,000</u>
c. Portion of cumulative expenses which stayed in Louisiana	<u>40,000,000</u>
d. Portion of 1971 expenses which stayed in Louisiana	<u>6,000,000</u>

SERVICE COMPANY PERSONNEL EMPLOYED IN
LOUISIANA OFFSHORE OIL AND GAS INDUSTRY 1/

		<u>Reference</u>
Fabrication Yards for Offshore Platforms	6,000	1
Derrick Barge	1,400	1
Deep Sea Divers	500	1
Boat Transportation	2,800	2
Helicopter and Float Planes	950	3
Oil Barges	170	2
Drilling Rigs	4,000	4
Workover Rigs	1,320	5
Production Equipment Fabricators	2,000	1
Caterers	1,500	6
Drilling Mud	870	7
Directional	120	8
Seismic	600	9
Contract Maintenance	1,000	10
Government Employees	350	11
Pipeline Companies	300	12
Pipeline Contractors	300	13
Supply Company	450	14
Wellhead Suppliers	400	15
Tool Companies	900	16
Service Companies	1,000	17
Miscellaneous	<u>3,070</u>	
Total	30,000	

1/ API Committee on Exploration, Subcommittee on Production 1971.

REFERENCES

1. Data quoted in Acadiana Profile, Vol. 2, No. 5 July/August 1970.
2. Data supplied by Shell Oil Company Transportation based on 950 boat + and a crew of 3 per boat and count of oil barge personnel.
3. PHI has about 900 employees (from PHI) plus other smaller companies.
4. Based on 80 active rigs with 50 men/rig average crew.
5. Based on 45 large rigs with 50 men/rig and 28 small rigs with 20 men/rig.
6. Based on Chevron personnel department survey of five of the largest offshore catering companies.
7. IMC and Millwhite report 270 people, assume 300 for Magcobar and Baroid and 300 for smaller companies.
8. Based on one man for 60 of 80 rigs plus one backup.
9. Based on 12 crew years with 50 men/crew.
10. Shell and Chevron report about 400 people in this category, estimated upward.
11. Reported by USGS, State Mineral Board, and Coast Guard.
12. U.S. Census shows 803 employed in Louisiana in this category, estimated downward for offshore component.
13. Based on 100 people for Brown and Root.
14. Bethlehem has about 45 men scaled by factor of 10 for numerous other suppliers.
15. Cameron reported 200 men, doubled for Grey, National, etc.
16. Otis reported 575, scaled upward for others.
17. Halliburton and Schlumberger estimate 680, scaled upward for others.

MISCELLANEOUS DATA

OCS Total Production Value 1953-1972 (U.S. Government)

Oil Condensate	\$9,011,860,920
Gas	3,228,114,633
Gasoline and LPG	221,413,785

OCS Total Royalty Value 1953-1972 (U.S. Government)

Oil Condensate	\$1,591,139,647
Gas	502,568,780
Gasoline and LPG	16,214,775

Total Royalty, Rental and Bonuses paid to State of Louisiana (1948-1971)

From Offshore Fields	\$ 678,000,000
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Petrochemical Plants in Louisiana

Number of Plants	56
Employees	20,000
Payroll	\$225,000,000/year

Petroleum Refining in Louisiana

Number of Operating Refineries	21
Estimated Crude Capacity	1,660,000 BPD
Employees	10,355
Payroll	\$110,900,000/year

In summary, the proposed sale is viewed as not adversely impacting the present socio-economic factors in Louisiana. In fact, the sale, by replacing declining output from other sources, will serve to maintain the levels of employment and income in the area as mentioned above.

Any increment or decrement to present output that results from this sale will have a pronounced effect on the area's economy. This is due both to the area's dependence on petroleum and related industries and the operation of the multiplier process.

J. Potential Impact of Royalty Bidding

Section I. indicate that 10 tracts will be offered on a royalty bidding basis, that is leases will be issued to the highest royalty bidder. The same operating orders and regulations (30 CFR 250) would apply to the royalty leases and consequently the provisions for protection of the environment would be the same as for other tracts in this sale. The matrix analysis indicates that seven of the ten tracts are gas prone and three are oil and gas prone. Two (Tract Nos. 193 and 290) have been classified as high environmental risk, three (Tract Nos. 25, 30, and 42) as moderate risk and five (Tract Nos. 80, 103, 145, 208 and 237) as minimum risk. The effects which royalty bidding for the tracts will have on Federal revenue, competition, and the rate of production can only be determined at the proposed lease sale and during subsequent production activities. It is possible, however, that less production would be derived from a royalty bid lease than from a bonus bid lease because production costs would be higher under the royalty system than under the current system.

If a reduction in the royalty rate were not obtainable, it is possible that the royalty leases would at a comparatively early point in time become uneconomic in terms of recovery, leading to early abandonment of the wells. If the leases were thus abandoned before all available oil and gas has been produced, it would be

necessary to compensate in some manner for this loss of expected production. This could be obtained in one of two ways. The Department could choose to offer leases on other lands containing estimated reserves equal to the amount of reserves lost in the abandoned royalty leases. An incremental environmental impact associated with the exploration and development of the additional leases would then take place. On the other hand, the royalty leases could be relinquished to the government and the lands subject to those leases could subsequently be reoffered, but even this would lead to additional environmental impacts arising from a new lessee's exploration and development of the tract.

It is also possible that the acquisition of royalty leases may be made by smaller companies lacking the necessary financial resources to provide the necessary environmental protection and, in particular, to assume the liability for damage arising from the operations. The Regional or National Oil and Hazardous Substances Pollution Contingency Plan provides, however, that the government would move in to clean up the oil in the event that the lessee could not do so, and subsequently bill the lessee for the cost of the cleanup.

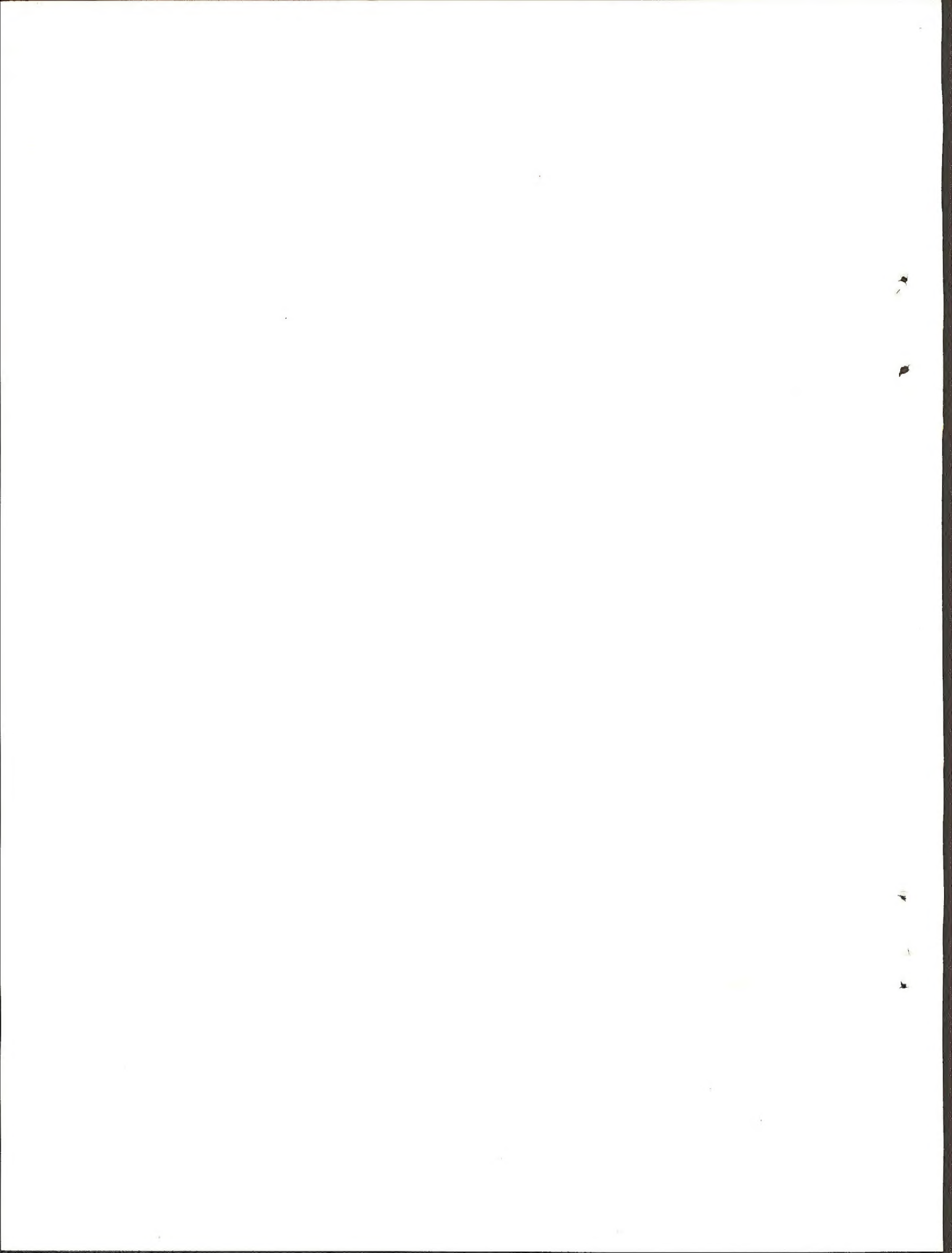
The above possibilities could be reduced, however, if the assumption is made that the money which would otherwise be spent on bonuses would be redirected into exploration and development, thus allowing a high royalty rate to be economic and to provide smaller companies with sufficient funds to account for the liability of damage.

Analysis of the environmental impacts of royalty bidding at this time must inevitably be hypothetical, and only by actual experience can the actual environmental impacts be learned.

K. A Matrix Analysis of Some Possible Adverse Impacts on the Environment and Related Uses

In this section, a matrix system is introduced for the purpose of identifying and analyzing on a tract-by-tract basis those factors resulting from the proposed sale which could have an impact on the environment and which lend themselves to such an analysis. The matrix itself is simply a device used for displaying the interrelationships of some of the impact-producing factors (on the horizontal axis of each matrix) with coastal activities and resources which could sustain an impact (on the vertical axis of each matrix), and for assigning values to these interrelationships.

1. Purpose - The purpose is to analyze some of the possible impacts of the proposed OCS lease sale on the environment using a matrix analytical technique in an attempt to provide the decision-maker and reviewer with an array of factors which must be considered in order to form value judgments concerning the importance of these impacts to the environment.
2. Significant Resource Factors - The matrix analysis examines major factors which could sustain negative impacts as a result of the development of the tracts included in the proposed lease sale. Significant resource factors appear on the vertical axis of each matrix and for purposes of this analysis have been identified and placed into two groups as follows:



a. Natural Resource System

Refuges/wildlife management areas 1/

Unique and highly productive areas 2/

Biota seaward of estuary/nursery areas

Beaches

b. Coastal Activities/Multiple Uses

Shipping

Recreation (boating, swimming, water oriented activities
other than sport fishing)

Commercial fishing

Sport fishing

3. Impact Producing Factors - The matrix includes two major categories of factors which can impact on significant resources (i.e., natural resource systems, and coastal activities) as a result of the development of proposed OCS oil and gas leases. The Impact-Producing Factors appear on the horizontal axis of each matrix and have been identified as follows:

a. Structures (e.g., platforms, fixed structures and artificial islands)

b. Oil Spills

1/ Includes parks, sanctuaries, historical landmarks, etc.

2/ Includes marsh, estuary, and nursery areas.

Other impact-producing factors such as debris and pipeline construction cannot be analyzed on a tract-by-tract basis, and therefore are not included in this matrix section. However, these and other factors were discussed on the basis of the entire sale earlier in the statement.

4. Analytic Procedures - Each impact-producing factor is assumed, i.e., structures are assumed to be erected on tracts, and a 1000 bbl. spill is assumed, and each is analyzed on the basis of (A) its potential magnitude and persistence which we have termed its importance, and (B) its proximity to high value resources or coastal activities/multiple-uses. A series of scales have been devised for the purpose of assigning a range of values consisting of importance and proximity to each impact-producing factor. These scales together with definitions and discussions are presented below.

(A) IMPORTANCE

a. Structures:

Under some conditions, offshore structures have an adverse effect on commercial fishing activities. Depending on currents and underwater obstacles an offshore structure can remove areas of trawling and purse seining waters. Heavy concentrations of platforms can make trawling and purse seining difficult.

Oil and gas platforms pose a hazard to commercial fishing and boating in general. Directional drilling from outside shipping lanes, however, can be used to develop tracts lying partially in shipping lanes.

An estimate of the importance of the impact of structures on the environment consists of two factors: 1) quantity--in this case it is estimated that all tracts 5,000 acres or more in size will average two structures per tract, even though some tracts may never be developed, and 2) time--all structures will remain on site for an average period of 15 to 20 years. Structures also have positive impacts; they may serve as aids to navigation and rescue stations, and they attract fish, which in turn attracts sports divers and sport fishermen.

b. Oil Spills:

The same two factors for estimating the importance of oil spills on the environment are as follows: 1) quantity--our analysis is based on all spills of 1,000 bbl. or more, and 2) time--based on past experience the oil itself may remain in contact with, or a hazard to, the environment for a period of 1 to 90 days.

A scale indicating the importance structures and oil spills pose to significant resources or coastal activities/multiple-uses follows:

SCALE OF IMPORTANCE

- 100 - Oil Spills: complete destruction of a resource within the immediate area of a spill, impossible to remedy or control; Structures: permanent obstruction and disruption of coastal activities/multiple uses.
- 80 - Oil Spills: very hazardous to life and extremely difficult to remedy; Structures: very inconvenient interference with coastal activities/multiple uses.
- 60 - Oil Spills: hazardous to plant and animal life and costly to remedy or control; Structures: inconvenient interference with coastal activities/multiple uses.
- 40 - Oil Spills: unsightly and potentially hazardous to plant and animal life but relatively easy to remedy or control; Structures: some minor inconvenience to coastal activities/multiple uses.
- 20 - Oil spills: unsightly; Structures: slight inconvenience.
- 0 - No adverse effect.

(B) PROXIMITY

Each tract is assigned a proximity number, based on its distance from shore or high-value resources.

A vector analysis consisting of nearshore current direction and velocity, and wind direction and velocity data in the study area would be necessary to construct an oil spill simulation model. Unfortunately, reliable and extensive nearshore surface current data are not available for the study area. However, observations for oil slicks indicate an average drift rate at approximately 3% of the surface wind speed in the direction of the wind. 1/ Therefore, this simple formulation will be applied to the extensive wind data available for the Gulf coast of Louisiana (see Attachment D) for monthly wind patterns based on records dating back as far as 1881 for the purpose of estimating the shoreward rate of drift of an oil slick. 2/ This in turn will serve as a basis for assigning proximity values to each tract in terms of its relation to shore or high value, vulnerable resources. It should be emphasized that the estimated direction and rate of oil slick movement is an approximation of the driving force exerted upon an oil slick by the wind. It does not consider slick geometries, natural dispersive forces,

1/ The 3% figure is an order-of-magnitude figure which, in our estimation is more representative of the open ocean than are some of the values reported in the literature pertaining to confined bays or semi-enclosed waters.

2/ A shoreward rate of drift is the single most important factor involved in estimating time and possible impact points of an oil spill on nearshore or onshore high value, vulnerable resources.

evaporation, absorption, dissolution or emulsification rates, and other forces that could cause cessation of the spreading movement of a slick.

The wind rose data in Attachment D indicates that the critical months for a possible shoreward slick movement in the New Orleans and Galveston areas would be March, April, May, June and July. An oil slick in the New Orleans area during these months would move at an estimated rate of 0.3-0.36 knots in the direction of the shore (i.e., north by northwest) at a 30-35% frequency. An oil slick in the Galveston area during these same months would move at an estimated rate of 0.30-0.34 knots in the direction of the shore (i.e., north by northwest) at a 35-40% frequency. The probability of an oil slick reaching shore is lower during the months of September, October, November, December and January than it is during the spring and summer months.

For purposes of analyses we have established a proximity scale which is based on the following assumptions:

- a) An oil spill of 1000 bbl. or more has occurred.
- b) The rate of shoreward drift of an oil spill in the study area under normal conditions is estimated at 0.3-0.5 knots. For purposes of this analysis the 0.5 knot rate is used.
- c) The shoreward movement of an oil slick will occur more frequently in the spring and summer than in the fall and winter, but no distinction concerning the season

will be included in the proximity scale. All tracts are considered to be in areas that could produce a shoreward drift of an oil slick at any given time should a spill occur. Although this would be least likely to occur with regard to tracts immediately seaward of the delta.

- d) A 12-hour response time is necessary to implement contingency measures to stop or retard oil from reaching shore, or high value, vulnerable resource area. The oil industry presently has a contingency plan for containing and cleaning-up oil spilled in Federal areas of the OCS offshore Louisiana and Texas which meets this response time capability.

Based on these assumptions each tract is assigned a proximity number based on the following scale:

PROXIMITY SCALE (Oil Spills)

1.0	-	Tract is within 7.0 statute miles of shore or significant resource.	<u>1/</u>
0.9	"	" " " 7.1-8.0 "	" " " " " "
0.8	"	" " " 8.1-9.0 "	" " " " " "
0.7	"	" " " 9.1-11.0 "	" " " " " "
0.6	"	" " " 11.1-13.0 "	" " " " " "
0.5	"	" " " 13.1-16.0 "	" " " " " "
0.4	"	" " " 16.1-19.0 "	" " " " " "
0.3	"	" " " 19.1-23.0 "	" " " " " "
0.2	"	" " " 23.1-27.0 "	" " " " " "
0.1	"	" " " 27.1-32.0 "	" " " " " "
0.0	"	" " " 32.1-up "	" " " " " "

The proximity scale with regard to structures takes into account their potential impact on shipping and their location in relation to unexplored munitions dumping area. This scale is different than that for oil spills, as shown below.

1/ A line 12 miles seaward of the shoreline or outer islands, where appropriate, represents the point from which proximity of tracts to intensive commercial and sport fishing activities are measured, i.e., tracts within 19 miles of the shoreline are assigned a value of 1.0, those from 19.1-20.0 are assigned 0.9, and so on.

Proximity Scale (Structures)*

- 1.0 - Tract partially within shipping lane, anchorage area,
natural resource system, activity or dumping area. 1/
- 0.8 - Tract within one mile of shipping lane, anchorage area,
natural resource system, activity or dumping area.
- 0.6 - Tract within 1.1-3 miles of shipping lane, anchorage area,
natural resource system, activity or dumping area. 2/
- 0.4 - Tract within 3.1-6 miles of shipping lane, anchorage area,
natural resource system, activity or dumping area. 3/
- 0.2 - Tract within 6.1-10 miles of shipping lane, anchorage area,
natural resource system, activity or dumping area.
- 0.0 - Tract beyond 10 miles of shipping lane, anchorage area,
natural resource system, activity or dumping area.

* Distances for commercial shipping were taken from the edge of a tract to the nearest edge of a shipping lane or anchorage area; all other distances were measured from the center of the tract.

- 1/ Tracts located in water depths shallower than 27m are assigned a value of 1.0 due to their location in areas of intensive commercial fishing.
- 2/ Tracts ranging in depth from over 27m to 64m are considered to be in an intensive commercial fishery area for only one species, such as brown shrimp. These tracts have been assigned a value of 0.6 to reflect the fact that offshore structures in these water depths will be in proximity to an intensive single species fishery.
- 3/ Each proposed tract located in water depths greater than 64 m has been assigned a value of 0.4. This value has been assigned to reflect the fact that commercial fishing activities occur throughout the Gulf and therefore, all platforms placed on the continental shelf will be in proximity to some kind of commercial fishing activity regardless of water depth or distance from shore.

(C) RELATIVE ENVIRONMENTAL IMPACT FACTOR

A relative environmental impact factor is a product of Importance, and Proximity, and is expressed both for structures, F (St) and oil spills, F (O.S.). The equation for obtaining this factor can be expressed simply as $I \times P = F$ (St. or O.S.).

The higher the relative environmental impact factor, the higher the potential for environmental damage. Tracts with overall high environmental indices will be singled out for additional consideration in accordance with the scale below. It is very important for the decision-maker or reviewer to keep in mind the possible synergistic and/or cumulative effects resulting from a tract having one or more categories within a high index range.

This scale of relative environmental impact factors is proposed for determining the potential damage a tract might pose to a significant resource or activity.

Relative Environmental Impact Scale

Greater than or equal to
50

Relative environmental impact factor in this range indicates that the tract should be carefully scrutinized. Depending upon the significance and character of the resource that may be affected, possibilities in the decision include:

- (1) Withdraw the entire tract from the proposed offering.
- (2) Offer only a portion of the tract.
- (3) Offer the tract with special stipulations included in the lease to reduce the potential for damage or hazard.
- (4) Offer the tract because of mitigating circumstances with or without special stipulations.

Greater than zero but
less than 50

Relative environmental impact factor in this range indicate that the tract could be developed safely within existing standard practices and operating regulations without significant damage to the resource involved. Additional special stipulations in the lease would not normally be necessary.

The individual, tract-by-tract, matrices have been appended to this statement. See Attachment H. The following section presents a recapitulation of the matrices and the section following that presents a summary risk analysis.

L. Recapitulation of the Matrices

1. Refuges/Management Areas

There is a total of 18 tracts (Tract Nos. 125, 126, 129, 130, 187, 188, 192-198, 200, 201, 204, 205, and 292) in this proposed sale that reflect an environmental impact factor for oil spill of 50 in relation to refuges/management areas. This reflects the fact that these tracts are each within 16 miles of one of the several wildlife refuges and management areas found along the Louisiana coastline and a massive oil spill from any of these tracts could affect these areas.

2. Unique and Highly Productive Areas

(Marsh, Estuary, Nursery)

There are 34 tracts (Tract Nos. 123-126, 129-131, 162-165, 168-170, 180, 182-184, 186-190, 192-198, 200, 204, 205, and 292) in this sale which reflect an environmental impact factor of over 50 for oil spills in relation to unique and highly productive areas. These areas could be severely affected by massive oil spills or leaks of long duration. Several are offshore banks or rises which may possibly serve as snapper/grouper habitats.

3. Biota Seaward of Estuary/Nursery Areas

All tracts in this proposed sale reflect an environmental impact factor of 40 for oil spills in relation to this natural

resource category. Of all the categories included in the matrix analysis, the adverse impact of an oil spill on biota in the open water of the sea, is the one about which the lease is known.

Although data in this area are sparse, some of the effects are discussed IV of this statement.

4. Beaches

There is one tract (Tract No. 195) in this proposed sale which has an environmental impact factor of over 50 for oil spills in relation to beaches.

5. Shipping

There is a total of 47 tracts (Tract Nos. 31, 33, 34, 40, 41, 43-45, 48-49, 53, 56-58, 83, 186, 188, 193-195, 197, 198, 200, 204, 205, 216-219, 225-233, 244, 245, 258, 259, 261, 273, 274) in this proposed sale which have an environmental impact factor of 80 for structures in relation to shipping. This is a reflection of the fact that each of these tracts are partially within shipping safety lanes. Development of these 47 tracts will be subject to Federal regulations as described in section V.B. of this statement.

There are an additional 18 tracts (Nos. 30, 32, 39, 42, 55, 185, 189-191, 196, 212, 234-236, 242, 243, 260 and 279) which have an environmental impact factor of 64 for structures in relation to

shipping. This is a reflection of the fact that each of these tracts are within one mile of established safety fairways. No other tracts in this proposed sale are within one mile of shipping safety fairways.

6. Outdoor Recreation

There is one tract (No. 195) in this proposed sale which reflect an environmental impact factor of 50 or more under either structures or oil spills for this category.

7. Commercial Fishing

There is a total of 14 tracts (Tract Nos. 125, 126, 129-131, 168-170, 180, 195-197, 200, 201) which have an environmental impact factor of 80 for both oil spills and structures in relation to commercial fishing. In addition, there are 78 tracts (Tract Nos. 1-42, 65-73, 84-96, 127, 128, 132-135, 157-161, 166, 167, 199) which have an environmental impact factor of 80 for structures in relation to commercial fishing and 23 tracts (Tract Nos. 181-194, 198, 202, 204, 205, 212, 286, 289, 292, 293) which have a factor of 80 for oil spills in relation to commercial fishing. Therefore, there are a total of 115 tracts in this proposed sale which have an environmental impact factor of 80 for either oil spills, structures or both in relation to commercial fishing. Accordingly, these tracts should be carefully scrutinized as part of the decision-making process.

In addition, tract Nos. 290, 295 have an environmental impact factor of 72 for oil spills in relation to commercial fishing; tract No. 287 have a impact factor of 64 and tract No. 294 have an impact factor of 56. All other tracts have factors less than 50 for the impact of structures and oil spills on commercial fishing.

A suggested stipulation concerning the development of all the tracts in this proposed sale has been presented in section V.B. If adopted, this stipulation would help mitigate the impact resulting from the placement of structures in relation to commercial fishing activities. However, the potential adverse impact on commercial fishing activities and commercial fish species resulting from oil spills cannot be mitigated by a special stipulation.

8. Sport Fishing

There are a total of 37 tracts (Tract Nos. 125, 126, 219-131, 168-170, 180-198, 200-202, 204, 205, 212, 286, 289, 292, 293) which have an environmental impact factor of 80 for oil spills in relation to sport fishing activities. Tract No. 123 has an impact factor of 72 for oil spills. This is a result of the proximity of these tracts to sport fishing areas.

In every case, the environmental impact factor of structures for sport fishing is fixed at a zero. This reflects the fact that

offshore structures have a favorable impact on sport fishing activities by concentrating fish around the platforms and thereby increasing the average catch. Eighty percent of the sport fishing from platforms is undertaken within 12 miles from shore, although some sport fishing craft make overnight trips and can venture out much further. A proximity value of 1.0 was assigned to each tract if it was located within 12 miles of the shoreline; 0.2 was assigned if it was located between 13 and 20 miles of shore, and 0.0 beyond 20 miles. Offshore platforms also serve as aids to navigation, a source of assistance in emergencies and havens for small boats in storms. Platforms resulting from blocks leases as a result of this proposed sale could be expected to have a positive and favorable impact on sport fishing and small boat recreationists over a period of time (up to 20-25 years).

9. Ordnance Disposal Areas

There are no ordnance disposal areas on the Louisiana OCS.

M. Summary Risk Analysis

Three risk categories will be used to rank the degree of potential hazard the tracts in this proposed sale pose to the environment. These categories are discussed below:

1. High Hazard Potential to the Environment

Highly hazardous may be generally defined as a tract which is oil, or oil and gas, prone and which is in such close proximity to a high value-critically vulnerable resource as to disallow the minimum present practical response time 1/ necessary to effectuate oil spill containment, clean-up and contingency measures to stop or retard the spill from impacting upon the resource. Also, a tract may be considered high hazardous if it is oil prone and is wholly located in an unstable sediment zone, or it shows potential impact on a number of other resources or resource uses as determined in the matrix analysis. In all, for this proposed sale there are 38 tracts which fall into the high risk potential category. Twelve tracts appear to be located in an unstable sediment zone around the Mississippi River delta. High resolution geophysical information concerning the nature of the bottom conditions for tract Nos. 186-194, 198, 204 and 205 must be obtained before these lease areas can be adequately evaluated. This information is supplied by the lessee with the exploration and

1/ Minimum practical response time would be at least 12 to 18 hours from the time a spill occurred to the time appropriate equipment can be at the spill site.

development plans required for each operation. For purposes of this summary risk analysis and given that the general data concerning bottom conditions in the area of the subject 12 tracts are available at this time, tract Nos. 186-194, 198, 204, and 205 are considered to pose a high hazard potential to the environment. In addition, however, these tracts are oil prone and are in close proximity to refuge and management areas and unique and highly productive areas of the delta, thus lending themselves to a high risk classification.

Tracts numbered 129-131, 168, 180, 182-185, 195-197, 200-202, and 212 are also considered to have high environmental risk due to the fact that they are oil prone and are close to the shore which in this location consists of marsh and estuarine areas and wildlife refuge and management areas.

Tracts numbered 286-295 are also considered to have high environmental risk for the following reasons: they are oil prone; they are relatively close to shore, which in this location consists of marshes, estuaries, refuges and management areas; and they are located in deep water, in some cases deeper than current operating depths in the Gulf of Mexico.

By including a tract in the high hazard potential category it is intended to point out that a particular tract should receive special consideration and analysis before it is offered, or special stipulations should be placed on it prior to development to insure safe development.

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2. Moderate Hazard Potential to the Environment

Moderately hazardous may be defined as an oil or oil and gas prone tract whose proximity to a high value-critically vulnerable resource does not preclude adequate response time (based on current industry capability in the Gulf of Mexico, offshore Louisiana and Texas) necessary to effectuate containment, clean-up and contingency measures to stop or retard the spill from impacting upon the unique resource area. Gas prone tracts which impact on commercial fishing or shipping are also placed in this category mainly due to their proximity to shipping lanes and/or areas in which commercial fishing is important. Most oil prone tracts, if not determined to be highly hazardous to the environment, are placed in this category for primarily two reasons: (a) either they are capable of spilling oil (the effects of an oil spill on open ocean marine biota is also considered adverse although not as severe as the effects on unique, usually nearshore or onshore, high value resources); or (b) no clean-up and containment equipment can be effectuated during adverse weather conditions, such as violent storms and hurricanes (this type of equipment available today is not very effective in five-foot or more seas).

In this proposed offering there are 129 tracts considered to be moderately hazardous to the environment. These tracts are as follows:

West Cameron - (Tract Nos. 1-29)
West Cameron - West Addition (Tract Nos. 30-42)
East Cameron - (Tract Nos. 65-73)
Vermilion - (Tract Nos. 84-96)
South Marsh Island - South Addition (Tract Nos. 116-118)
South Marsh Island - North Addition (Tract Nos. 125-128)
Eugene Island - (Tract Nos. 132-135, 138)
Eugene Island - South Addition (Tract Nos. 140, 141)
Ship Shoal - (Tract Nos. 157-161)
Ship Shoal - South Addition (Tract Nos. 162, 163)
South Pelto - (Tract Nos. 166, 167)
South Timbalier - (Tract Nos. 169-175)
Grand Isle - (Tract No. 177)
Grand Isle - South Addition (Tract Nos. 178, 179)
West Delta - (Tract No. 181)
Main Pass - (Tract No. 203)
Main Pass - South and East Addition (Tract Nos. 210, 211)
Mobile South No. 2 - (Tract Nos. 258-285)

3. Minimal Hazard Potential to the Environment

Minimally hazardous may be defined as a gas prone tract whose development under existing operating orders, regulations and safety requirements promises a low level of disruption and adverse effects to the environment. Experience indicates that the impacts resulting from development of tracts of this type are not so much ecological in nature as they are conflictual with other uses or activities in a marine area. In most cases, such conflicts or hazards can be mitigated by enforcement of existing regulations or by attaching special conditions or stipulations to the lease concerning its development.

In this proposed sale, 107 tracts in the following lease areas are considered to be minimally hazardous to the environment:

West Cameron - West Addition (Tract Nos. 43-46)
West Cameron - South Addition (Tract Nos. 47-64)
East Cameron - (Tract Nos. 74, 75)
East Cameron - South Addition (Tract Nos. 76-83)
Vermilion - (Tract No. 97)
Vermilion - South Addition (Tract Nos. 98-108)
South Marsh Island - South Addition (Tract Nos. 109-115)
Eugene Island - (Tract Nos. 136, 137)
Eugene Island - South Addition (Tract Nos. 139, 142, 143)
South Timbalier - South Addition (Tract No. 176)
Main Pass - (Tract No. 199)
Main Pass - South and East Addition (Tract Nos. 206-209)
Garden Banks, (Zone 15) - (Tract Nos. 213-245)
New Orleans (Zone 15) - (Tract Nos. 246-257)

This conclusion is based on the following considerations: a) all are gas prone tracts, b) all are deeper than 27m, and thus have less impact on commercial fishing; and c) all are farther than one mile from the nearest shipping lanes.

Additionally, the 21 oil and gas prone tracts numbered 119-124, 144-156, 164, and 165 are considered minimally hazardous to the environment for the following similar considerations: a) all are farther than 66 miles from the coast; b) all are located in water depths greater than 64m; and c) all are farther than one mile from the nearest shipping lanes.

None of the 128 tracts denoted as minimally hazardous to the environment are located in unstable sediment zones, and any unforeseen conflicts with other uses and activities of the areas will be mitigated by regulations, operating orders, and where necessary, special stipulations.

For specific tract-by-tract characteristics see the appended matrix tables and the preceding section titled "Recapitulation of the Matrices".

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V. MITIGATING MEASURES INCLUDED IN THE PROPOSED ACTION

The Department has developed the following strategy for safe development of the mineral resources of the OCS.

Management of the mineral resources of the OCS will be conducted in such a manner as to cause these resources to make a significant contribution toward supporting the present and future national economy at a rate consistent with maximum possible protection of the environment, orderly and timely development of the resource, and receipt of a fair market value return to the Federal Government.

Reasonably safe development of oil and gas resources on the OCS can be achieved through strict enforcement of lease stipulations and obligations, (detailed in the OCS operating regulations and orders) 1/ and must be based on sound operating practices backed by effective contingency actions in the event that pollution occurs as a result of a natural disaster, human error, or equipment failure.

Research and development programs in exploration, production, transportation, containment and clean-up technology, all of which provide greater safeguards for the environment, are being conducted by the Department of the Interior, other Federal agencies and

1/ OCS operating orders for the Gulf of Mexico have been appended to this statement. See Attachment A.

private industry. The Coast Guard in fiscal year 1972 spent in excess of \$3,000,000 for research and development on oil containment booms, oil recovery devices and techniques for forecasting movement of oil slicks. The oil industry during the period 1966-72 has reportedly committed nearly \$235,000,000 for environmental research and development on air and water pollution. Currently the American Petroleum Institute (API) and the USGS have a cooperative effort underway which will document research work on safety and anti-pollution equipment, recommend additional research, and supervise the management of additional safety or anti-pollution research projects funded by API. As advances are made, OCS operating regulations and orders will be revised and the new technology applied to existing leases as well as new leases. Revisions of the regulations and formulations of lease stipulations may also result from the review of environmental impact statements by the agencies and the interested public.

The following discussion concerns the mitigatory measures which will influence possible adverse impacts that could result from this proposed sale. These measures are presented as they relate to oil spills, offshore structures and pipelines as well as other impact-producing activities associated with OCS oil and gas development.

A. Oil Spills

1. Regulations

Regulations governing OCS oil and gas lease operations in the Gulf of Mexico are contained in Title 30, Code of Federal Regulations and OCS Orders Nos. 1-4, 6, 7, dated August 28, 1969, No. 5, dated June 5, 1972, Nos. 8-9, dated October 20, 1970, No. 11, dated April 5, 1972, and No. 12, dated August 13, 1971. (See Attachment A). Leasing regulations are contained in Title 43, Code of Federal Regulations. The regulations established procedures and requirements to be followed in all stages of lease operations: exploration and development, drilling, production, transportation (pipeline construction and operation) and abandonment.

A general description of operating requirements under the existing regulations follows:

a. Plans: Operating plans must be submitted by the operators and approved by the Geological Survey (GS) before each stage of operations is initiated (exploration, development, abandonment). Approval of all operations must be obtained prior to their commencement.

b. Operator Inspection and Testing: The operator is required to inspect all aspects of the safety systems at specific intervals, e.g., daily pollution inspection on manned facilities, "frequent" inspection on unmanned facilities, monthly test of check valves. Detailed records of inspections and tests are required. 1/

1/ See Vol. 2, Attachment I for drilling and production inspection report forms and the code book which provides interpretation.

c. Reports: The operator is required to report all spills or leakage of oil to GS without delay. He is also required to notify GS of any unusual condition, problem or malfunction within 24 hours. 1/

d. Safety Devices: Required safety devices include subsurface safety devices, high-low pressure shut-in controls, high liquid level shut-in controls, pressure relief valves, automatic fail-close valves at the well head, automatic fire fighting systems, automatic gas detector and alarm systems, and other safety devices on production equipment; high-low pressure sensing devices and automatic shut-in valves on pipelines; and blowout preventers, related well control equipment, and mud system monitoring equipment on drilling wells.

e. Waste Disposal: The lessee is prohibited from disposing into the ocean any oil (except that oil in produced formation water must average no more than 50 ppm) 2/, untreated waste material or other materials which may be harmful to aquatic life or wildlife. Any drilling mud which may contain toxic substance must

1/ 30 CFR 250.45.

2/ OCS Order No. 8 (2.A.(5), Gulf of Mexico, Attachment A.

be neutralized before it can be dispersed in the ocean. Drill cuttings which are predominantly sand and shale, must be processed, and oil removed, before they can be disposed of in the ocean. 1/ Sewage samples shall be collected semi-annually by lessee personnel and the samples submitted to a laboratory for analysis. Results of the analysis will be available on the platforms and rigs for inspection by the USGS technicians. GS personnel are responsible for enforcing the requirement but do not take the samples..

f. Site Clearance: When an installation is no longer needed for development of the lease, the well is plugged with cement and all casings and piling must be severed and removed to at least 15 feet below the ocean floor and the location must be dragged to clear the site of any obstruction.

g. Debris: Regulations and OCS Orders prohibit the disposal of debris into the Gulf of Mexico. Solid waste must be either incinerated or transported to shore for disposal in accordance with applicable requirements under State and Federal law.

h. Contingency Plans and Equipment: The operator is required to have an approved plan for controlling and removing pollution which provides for:

1/ Waste disposals must comply with the 1972 Amendments of the Federal Water Pollution Control Act. Permits for disposals must be obtained from EPA under the National Pollutant Discharge Elimination System. See Sec. V.D.7. of this volume.

- (1) Standby pollution control equipment, including containment booms, skimming apparatus, and approved chemical dispersants immediately available to the operator at a land based location.
- (2) Regular inspection and maintenance of such equipment.

The Oil and Hazardous Substances Pollution Contingency Plan, Gulf Coast Region, is operative and has recently been revised and updated to agree with the National Plan 1/. In addition, the Coast Guard has established the Gulf Coast Team of the National Strike Force (NSF) at the NASA Mississippi Test Facility, Bay St. Louis, Mississippi for the purpose of responding to oil spills in the Gulf of Mexico. The National Strike Force has been established in accordance with the Federal Water Pollution Control Act and the National Oil and Hazardous Substances Contingency Plan.

The Gulf Coast Team is fully operative at this time and presently consists of 14 men with plans to increase to a total of 19 men in the near future. This team is capable of responding to incidents within 2 hours of notification by the appropriate District Commander.

2. Inspection

Evidence of compliance with the regulations and lease requirements is obtained through surveillance of the operations under the lease and enforcement of specific requirements. The inspection system

1/ See also v.A.4.b. of this volume and discussion of the National Oil and Hazardous Substances Pollution Contingency Plan.

of the Geological Survey includes: (1) review and approval of plans before each operating stage is initiated, (2) close review and follow-up as necessary, by GS inspectors, of all reports required of the operator by the regulations and orders, (3) on-site inspection and (4) aerial monitoring through the use of helicopters (operators are also required to inform each other of oil spills or other irregularities which they observe).

a. Operator reports: A comprehensive reporting system covering all oil spills and any unusual conditions (for example: reporting and investigation of a persistent oil slick from an unknown source such as a sunken ship or natural oil seep) is required by the orders and is a key factor in monitoring operations. Operators are also required to maintain records for GS inspection of required periodic tests of safety equipment. Compliance with reporting requirements can be assured only by periodic on-the-site inspection and aerial monitoring.

b. On-Site Inspection: During the course of drilling, all operations are inspected at least one time. Leases in certain areas or in a particular development stage may require more inspections to assure the achievement of safety objectives. GS is continuing the systematic inspection program and a more stringent enforcement policy. This has resulted in increased

operator compliance along with greater coverage of production operations and better documentation of inspection results.

A complete drilling inspection is normally conducted on each drilling rig approximately every six weeks. Random inspections may be made more frequently. Depending on the number of drilling rigs in each District, the frequency of inspections on a rig may vary from six to twelve per year. All producing platforms are inspected at least once a year and random inspections are made more frequently on some. The frequency rate for platform inspections is approximately once every nine months.

The total number of warnings issued and suspensions ordered for infractions of OCS Orders which occurred during normal daily inspections from December 1, 1972 through January 31, 1974, are as follows:

<u>WARNINGS</u>			<u>SUSPENSIONS</u>		
<u>Drilling</u>	<u>Workover</u>	<u>Production</u>	<u>Drilling</u>	<u>Workover</u>	<u>Production</u>
35	3	2,164	15	4	1,198

Approximately 148 on-site inspections of pollution incidents were made from December 1, 1972 through January 31, 1974, in response to reports submitted by operators.

Listed below are the results of on-site inspections performed in response to the observations made during pollution surveillance flights conducted from December 1, 1972 through January 31, 1974:

<u>Pollution Inspections</u>	<u>No. Platforms</u>	<u>No. Wells</u>	<u>Warnings</u>	<u>Suspensions</u>
49	144	962	31	20

A program of intensive inspections is used on OCS leases. Periodically, all available inspectors devote a week to a special inspection, whereupon production platforms and drilling wells are inspected on a random basis; inspections during other periods are conducted on a regular basis with emphasis on operations believed to require special attention. The GS inspector force in the Gulf of Mexico has increased from 7 technicians and 5 engineers as of July 1, 1969 to 28 technicians and 15 engineers as of January 31, 1974. During the period November 1, 1972 through January 31, 1974, technicians spent 4,188 inspection days or 34,893 man-hours, and engineers 452 inspection days or 3,614 man-hours in the field. Detailed inspections were conducted on 1,235 major producing platforms and 801 minor platforms (out of a total of 2000) in the Gulf of Mexico from December 1, 1972 through September 30, 1973. Also, during this time period, 813 inspections of single-wells or satellites were made by boat. Approximately 60% of these inspections were unannounced. Included in these inspections were 13,821 well completions. Also, during this time period, 1,311 inspections of drilling rigs were conducted. As of January 31, 1974 in a total of 11,383 holes, there were 9,691 completions capable of producing oil and gas on the OCS lands offshore

Louisiana and Texas. 1/ Approximately 65 drilling rigs were operating in Gulf of Mexico OCS waters at the end of January, 1974.

c. Aerial Monitoring: "Fly-overs" of the OCS operating areas are programmed on a seven day per week basis by GS inspectors. Any indications of oil pollution or other non-compliance will be followed immediately by an on-site inspection.

During the period January 1 through September 30, 1973, 1,106 pollution surveillance flights were made. The helicopters chartered by the Geological Survey for use of the inspecting personnel flew a total of 4,088 hours.

3. Enforcement

The enforcement policy is intended to: (1) reduce the frequency of non-compliance with lease requirements which may lead to loss of life, loss of property, or damage to the environment; and (2) maintain uniform enforcement standards to be applied to all operations affecting OCS lands in the Gulf of Mexico. When, in the course of an inspection, a requirement pertaining to the prevention of oil pollution or any other safety hazard is found to be in non-compliance, the operation will be shut-in until it is brought into compliance. After a

1/ This figure does not include service completions.

shut-in, the operation can only be resumed by authorization of the GS; in all cases, this requires reinspection or a waiver of the inspection requirement. Minor incidents of non-compliance may require only a warning that corrections be made within a week. The operations will be shut-in if the required corrections are not made.

Additional penalties for non-compliance are specific in P.L. 83-212, Outer Continental Shelf Lands Act, Sec. 5(a)(2). "Any person who knowingly and willfully violates any rule or regulation prescribed by the Secretary for the prevention of waste, the conservation of the natural resources, or the protection of correlative rights shall be deemed guilty of a misdemeanor and punishable by a fine of not more than \$2,000 or by imprisonment, and each day of violation shall be deemed to be a separate offense." Also Sec. 5(b)(1) and (2) provide for cancellation of non-producing and producing leases by notice subject to judicial review or appropriate judicial proceedings.

The following tables (Tables 6, 7, 8) indicate equipment malfunctions detected during inspections and enforcement actions over three separate periods. Minor incidents of non-compliance result in formal warnings while incidents of non-compliance of a potentially more hazardous nature result in well or platform shut-ins until the operation is in full compliance with regulations and orders.

These tables indicate specific items found to be in non-compliance during special inspections. Basic pollution control items of production equipment in which malfunctions were detected for the time periods identified are as follows:

Table 6 EQUIPMENT MALFUNCTION DETECTED DURING JANUARY THROUGH NOVEMBER, 1971 SPECIAL INSPECTIONS

	<u>No. Checked</u>	<u>Operable</u>	<u>Inoperable or not within acceptable tolerances</u>	<u>Percent Failure</u>
Surface Safety valves	2392	2306	86	3.6%
Flowline sensors	4166	4081	85	2.0%
Check Valves	2222	2052	170	7.7%
Pressure vessels				
High pressure sensors	908	875	33	3.6%
Low pressure sensors	765	744	21	2.8%
Low level shut-in	511	481	30	5.9%
High level shut-in	460	439	21	4.6%
Total	11,424	10,978	446	3.9%

Table 7 EQUIPMENT MALFUNCTION DETECTED DURING JANUARY THROUGH NOVEMBER 197 SPECIAL INSPECTION

	<u>No. Checked</u>	<u>Operable</u>	<u>Inoperable or not within acceptable tolerances</u>	<u>Percent Failure</u>
Surface Safety valves	1,492	1,423	69	4.6%
Flowline sensors	1,327	1,290	37	2.8%
Check Valves	1,469	1,385	84	5.7%
Pressure Vessels				
High pressure sensors	1,100	1,077	23	2.1%
Low pressure sensors	784	771	13	1.7%
High level shut-in	405	398	7	1.7%
Low level shut-in	383	375	8	2.1%
Total	6,960	6,719	241	3.5%

Table 8. EQUIPMENT MALFUNCTIONS DETECTED JANUARY THROUGH
SEPTEMBER, 1973 SPECIAL INSPECTIONS

	No. <u>Checked</u>	<u>Operable</u>	Inoperable or not within acceptable <u>tolerances</u>	Percent <u>Failure</u>
Surface safety valves	1,188	1,131	57	4.8%
Flowline sensors	385	378	7	1.8%
Check valves	1,170	1,092	78	6.7%
Pressure Vessels				
High pressure sensors	857	841	16	1.8%
Low pressure sensors	521	514	7	1.3%
High level shut-in	217	212	5	2.2%
Low level shut-in	<u>258</u>	<u>251</u>	<u>7</u>	<u>2.7%</u>
Total	4,596	4,419	177	3.9%

Subsurface operated subsurface safety valves are periodically pulled from the wells and checked. This requires removing the valve from the well to inspect and repair or adjust as necessary and reinstall. One company utilized test stands to test the valves performance characteristics under simulated flow and pressure conditions. Surface operated subsurface safety valves are tested in place by releasing hydraulic pressure within the closed system to close the valve and repressuring to open. An average reporting period from May 1973 through July 1973 resulted in approximately 3,000 subsurface safety valves being checked. Of this amount there were 394 failed components detected in the valves but a number of the valves had more than one failed component.

Companies fined in District Court for failure to install subsurface safety devices in offshore oil wells during 1970 in the Gulf of Mexico are presented below (Table 9). Each company entered a plea of nolo contendere. The maximum fine for violation of the Outer Continental Shelf Lands Act is \$2,000 per count.

Table 9. MAXIMUM FINES

Chevron Oil Company	\$1,000,000
Gulf Oil Company	250,000
Tenneco	32,000
Kerr-McGee	20,000
Mobil	150,000
Continental	242,000
Humble	300,000
Shell	340,000
Union of California	<u>24,000</u>
	\$2,358,000

No data for direct comparison of pollution incidences for similar time periods before and after the current "more stringent enforcement policy" are available. However, experienced personnel, private and government, are aware that after public attention was focused on the oil spill at Santa Barbara in January 1969, there has been a great deal less oil pollution in the Gulf from normal oil and gas producing operations. The public awareness, concern, and demand to prevent pollution have been a major factor in the reduction of oil spills.

In the past, major events were catalogued, but less serious events where often not reported. Occasionally, some years ago, wells were even intentionally flowed into the water for short periods during clean-up operations. Now, sophisticated burning devices are designed to consume this well clean-up oil without air or water pollution. More automatic equipment is now in use to shut-in production whenever a leak occurs in pipeline or production facilities. These include but are not limited to pressure sensors and high and low level controls. Drip pans are placed under valves, vessels, and the production system to prevent leaking oil from escaping into the waters of the Gulf.

New reporting and investigative procedures established in the last two years have increased many fold the number of pollution incidents reported as well as the time spent by GS personnel in surveillance flights by helicopters in assuring proper documentation of pollution events.

There have been several detailed studies recently completed concerning operating practices on the OCS. The Department's response to these studies and the steps being taken at this time will improve many facets of OCS management practices. For a discussion of these studies see Vol. 1, Sec. 1.G.

4. Contingency Action

Oil spills will occasionally occur as a result of natural disasters, equipment failure or human error. In the event that such an emergency occurs, the following action will be taken:

a. Requirements of OCS Order No. 7 1/

In the case of any spill, the operator is required to initiate action to control and remove the oil pollution in accordance with his approved emergency plan. In any case, a spill or leakage of less than 15 bbls. requires a report from the operator as to the nature of the spill or leakage, why it occurred and what steps were taken to correct it. A spill of 15-20 bbls. must be reported by telephone immediately to GS and confirmed in writing. A spill of over 50 bbls, or one of any magnitude that cannot be immediately controlled, must be reported immediately to the Coast Guard and the Environmental Protection Agency as well as to GS.

b. Regional or National Contingency Plans

If the operator should be unable to control and remove the pollution, the Regional or National Oil and Hazardous

1/ See Attachment A.

Substances Pollution Contingency Plan may be activated and the designated Federal On Scene Coordinator would direct control and clean-up operations at the operator's expense. This has never been necessary in the case of any spill from OCS operations to date.

The Regional or National Oil and Hazardous Substances Pollution Contingency Plan was developed pursuant to the provisions of the Federal Water Pollution Control Act as amended (33 U.S.C. 1101).

(EPA has published the revised National Oil and Hazardous Substance Pollution Contingency Plan as required by the Federal Water Pollution Control Act Amendments of 1972.) Section 11(c)(2) of that statute authorizes the President, within sixty days after the sections becomes effective, to prepare and publish such a Plan. The Plan provides for efficient, coordinated, and effective action to minimize damage from oil (and other) discharges, including containment, dispersal, and removal. The Plan includes (a) assignment of duties and responsibilities, (b) identification, procurement, maintenance and storage of equipment and supplies, (c) establishment of a strike force and emergency task forces, (d) a system of surveillance and notice, (e) establishment of a national center to coordinate response operations, (f) procedures and techniques to be employed in identifying, containing, dispersing and removing oil, and (g) a schedule identifying dispersants and other chemicals that may be used in carrying out the Plan, the waters in which they may be

used, and quantities which may be safely used. 1/ The Plan is revised from time to time as necessary. Operation of the National Contingency Plan requires a nationwide net of regional contingency plans. Guidelines for that nationwide net are established in the National Plan. This plan provides for a pattern of coordinated and integrated responses to pollution spills of departments and agencies of the Federal Government. It establishes a national response team and provides guidelines for the establishment of regional contingency plans and response teams. The Plan also promotes the coordination and direction of Federal, State, and local response systems and encourages the development of local government and private capabilities to handle such pollution spills.

The objectives of the Plan are: to develop appropriate preventive and preparedness measures and effective systems for discovering and reporting the existence of a pollution spill; to institute promptly, measures to restrict further spread of the pollutant; to assure that the public health, welfare, and natural resources are provided adequate protection; to provide for the application of techniques to clean up and dispose of the collected pollutants; to provide for a scientific response to spills as appropriate;

1/ Annex X of the Plan basically sets forth a no dispersant policy. Exceptions can be made for safety reasons (to prevent fire or explosions) or for certain other circumstances such as the protection of endangered waterfowl. However, the approval of EPA is required, except in case of safety when the approval of the On-Scene Coordinator is required.

to provide strike forces of trained personnel and adequate equipment to polluting spills; to institute actions to recover clean-up cost; and, to effect enforcement of existing Federal statutes and regulations issued thereunder. Detailed guidance toward the accomplishment of these objectives is contained in the basic Plan, the annexed, and the regional plans.

The Plan is effective for all United States navigable waters including inland rivers, Great Lakes, coastal territorial waters, and the contiguous zone and high seas beyond this zone where a threat exists to United States waters, shoreface, or shelf-bottom. Its provisions are applicable to all Federal agencies.

A memorandum of understanding between the Departments of the Interior and Transportation outlines the respective responsibilities of the Geological Survey and the Coast Guard under the National Contingency Plan. GS is responsible for the coordination and direction of measures to abate the source of pollution when the source is an oil, gas, or sulphur well. This responsibility includes the authority to determine whether pollution control operations within a 500 meter radius of the pollution source should be suspended to facilitate measures to abate the source of pollution. The Coast Guard is responsible for coordination and direction of measures to contain and remove pollutants, and shall furnish or provide for the On Scene Coordinator with authority and responsibilities as provided by the National Contingency Plan.

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c. Petroleum Industry Contingency Actions

(i) Inventory of Known Resources Available for
Emergency Oil Spill Control and Clean-Up

From the upper Texas Coast to the Mississippi Delta region offshore operators maintain a large inventory of various kinds of equipment that could be put to use on short notice for containing and cleaning up an oil spill and killing the source of the spill. This inventory includes 177 boats ranging from 30 foot crewboats to 165 foot utility and cargo vessels, 64 helicopters, 103 fixed-wing aircraft. For a complete inventory of oil spill containment and clean-up equipment see Vol. 2 Attachment J

(ii) Clean Gulf Associates

Clean Gulf Associates is a non-profit organization formed by thirty-three companies 1/ operating in the OCS. Their purpose is to provide for a stock pile of oil spill containment and clean-up materials for use by member companies in offshore and estuarine areas. Clean Gulf Associates has contracted, effective August 1, 1972, with Halliburton Services to supply equipment, materials and personnel necessary to contain

1/ These thirty-three member companies produce 98% of offshore petroleum.

and clean-up spills in the Gulf of Mexico to the limits of the OCS lying offshore and seaward of the States of Texas, Louisiana, Mississippi, Alabama, and Florida.

All of the tracts considered in this proposed lease sale fall within this area. Before any drilling commences, should this proposed sale be held, an inventory of pollution combatting equipment would be stockpiled at a strategic location. Should oil reservoirs be found and production ensue, a permanent base for containment and clean-up equipment will be established. For a special stipulation concerning oil spill containment and clean-up equipment available in the proposed sale area see Section V.D.1.

At the present time, Halliburton maintains four types of recovery/clean-up systems for development at two primary bases located at Intercoastal City, and Grand Isle, Louisiana, and a sub-base at Venice, Louisiana and include:

- (1) Fast response open sea/bay skimmer system
- (2) High volume open sea skimmer system
- (3) Shallow water skimmer system
- (4) Auxiliary shallow water and beach clean-up equipment.

For a complete inventory of oil spill containment and clean-up equipment see Vol. 2 Attachment J.

B. Structures

If a ship strays from established safety fairways, oil and gas platforms can pose a hazard to commercial shipping. This hazard, however, is minimized by the fact that safety fairways are clearly designed on navigation charts. Directional drilling from outside safety lanes is used to develop tracts lying partially in safety lanes. Pertinent portions of the Federal Regulations (33 CFR Sec. 209.135(b), 1971), governing shipping fairways and anchorage areas are as follows:

"The Department of the Army will grant no permits for the erection of structures in the area designated as fairways, since structures located therein would constitute obstructions to navigation. The Department of the Army will grant permits for the erection of structures within an area designated as an anchorage area, but the number of structures will be limited by spacing as follows: The center of a structure to be erected shall be not less than two (2) nautical miles from the center of any existing structures. In a drilling or production complex, associated structures shall be as close together as practicable having the consideration for the safety factors involved. A complex of associated structures, when connected by walkways, shall be considered one structure for the purposes of spacing. A vessel fixed in place by moorings and used in conjunction with the associated structures of a drilling or production complex, shall be considered an attendant vessel and its extent shall include its moorings. When a drilling or production complex includes an attendant vessel and the complex extends more than five hundred (500) yards from the center of the complex, a structure to be erected shall be not closer than two (2) nautical miles from the near outer limit of the complex. An underwater completion installation in an anchorage area shall be considered a structure and shall be marked with a lighted buoy as approved by the United States Coast Guard."

Development of the tracts in this proposed sale which lie partially within shipping fairways or anchorage areas if leased will be subject to Federal regulations as presented above so far as placement of structures is concerned and this would help mitigate any potential impact due to the proximity of structures to relatively high frequency sea traffic.

Commercial vessels are required to report to the Coast Guard whenever a casualty results in any of the following: (a) actual physical damage to property in excess of \$1500, (b) material damage affecting the seaworthiness or efficiency of a vessel, (c) stranding or grounding, (d) loss of life, (e) injury causing any person to remain incapacitated for a period in excess of 72 hours; except injury to harbor workers not resulting in death and not resulting from vessel casualty or vessel equipment casualty. Drilling and production platforms (artificial islands) are required to report to the Coast Guard when involved in a casualty or accident and if any of the following occur: (a) if hit by a vessel and damage to property exceeds \$1500, (b) damage to fixed structure exceeds \$25,000, (c) material damage affecting usefulness of lifesaving or fire-fighting equipment, or (d) loss of life.

Under some conditions, offshore structures are an obstacle to commercial fishing activities. Depending on currents and underwater obstacles an offshore structure can remove areas of trawling and purse seining waters. Heavy concentrations of platforms can make trawling and purse seining difficult.

H. J. G.

The erection of more structures on the OCS may affect commercial fishing operations. The impact from platforms may be kept to a minimum, however, by only allowing those structures necessary for proper development and production of the mineral resources, and by placing them with due regard to fishing operations and other competing uses which are evident at the time of platform approval.

The Area Oil and Gas Supervisor considers the views of commercial fishing organizations such as the Gulf State Marine Fisheries Committee with regard to placement of platforms. The Supervisor also from time to time requests information from the Department of Commerce, National Oceanic and Atmospheric Administration, and National Marine Fisheries Service to be used in his decision-making process of approving or disapproving platform installation. Within the constraints of location of the reservoirs and the technology necessary to drill directional wells, the Supervisor is mindful that platform location is an important consideration for commercial fisheries and does make decisions to minimize the impact of platform location on the commercial fishing industry.

In an effort to further mitigate the impact of offshore structures resulting from this proposed sale with regard to commercial fishing and other significant existing or future uses of the leased area, a lease stipulation giving effect to the following will be applied to all blocks in this proposed offering in the event they should lease:

"Structures for drilling or production, including pipelines, shall be kept to the minimum necessary for proper exploration, development and production and to the greatest extent consistent therewith, shall be placed so as not to interfere with other significant uses of the Outer Continental Shelf including commercial fishing. To this end, no structure for drilling or production, including pipelines, may be placed on the Outer Continental Shelf until the Supervisor has found that the structure is necessary for the proper exploration, development, and production of the leased area and that no reasonable alternative placement would cause less interference with other significant uses of the Outer Continental Shelf including commercial fishing. The lessee's exploratory and development plans, filed under 30 CFR 250.34, shall identify the anticipated placement and grouping of necessary structures, including pipelines, showing how such placement and grouping will have the minimum practicable effect on other significant uses of the Outer Continental Shelf, including commercial fishing.

C. Pipelines

The potential impacts of each specific nearshore and coastal pipeline construction project are considered by the Department in its review of Corps of Engineers permit applications.

Data concerning the miles and sizes of pipes needed, proposed routes, amount of dredging anticipated, cannot be determined until such time as the exact location of production has been delineated. The Department will conduct an environmental analysis on any application for a pipeline right-of-way that it receives. If it is determined that a pipeline right-of-way will have a major impact on the marine or coastal environment then an environmental statement will be prepared.

The adverse effects associated with pipeline installation can be substantially reduced with adequate planning and by using the most appropriate construction techniques. For example, pipeline corridors or existing pipeline canals can be used whenever possible so that adverse impacts are restricted to fewer locations. Where wetlands are involved, pipelines can come ashore on elevated terrain to minimize damage to marshlands. Also in wetland areas, bulkheads usually are placed in canals to prevent salt-water intrusion and to maintain existing drainage and water-exchange routes. To protect oysters, pipelines usually are routed around major oyster reefs, and where shallow estuaries are to be crossed, the canal usually is backfilled; in many cases so are canals through marshlands. Although all of these

measures help to mitigate the problem, the impact of pipeline installation on the coastal environment requires the joint effort of many agencies and authorities for successful resolution.

Agencies having responsibility or jurisdiction over all or part of oil and gas pipeline installation or operation in coastal areas are: (1) Department of the Interior, (a) Bureau of Land Management--rights-of-way for common carrier pipelines on the OCS, (b) Geological Survey--jurisdiction over producer owned gathering lines and flowlines on the OCS, (c) Bureau of Sport Fisheries and Wildlife--protection of fish and wildlife resources and their habitat through consultation with the Corps of Engineers in the process of issuing Federal permits in navigable waters; (2) U.S. Army Corps of Engineers--issues permits for construction (including pipelines) on OCS and in other navigable waters; (3) Federal Power Commission--grants certificates of convenience and necessity prior to construction of interstate natural gas pipelines; (4) Interstate Commerce Commission--grants approval of the tariff rates for transportation of oil by common-carrier pipelines; (5) State of Louisiana--grants rights-of-way through navigable waters under State jurisdiction; (6) Department of Transportation, Office of Pipeline Safety--establishes standards for pipeline construction, operation and maintenance; and (7) Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service--protection of marine fishery resources and their

habitat (in coordination with the Bureau of Sport Fisheries and Wildlife), through consultation with the Corps of Engineers in the process of issuing Federal permits in navigable waters.

At present the cooperative effort between the Department of the Interior and the Corps of Engineers, and the National Marine Fisheries Service and State conservation agencies is responsible for minimizing the impact of pipeline (and other) construction in navigable waters of the United States. The Corps of Engineers, through authority of the Rivers and Harbors Act of 1899, (33 U.S.C. 403), asserts authority over and requires a permit for construction in all navigable waters subject to the Submerged Lands Act (43 U.S.C. §1301), and includes all lands permanently covered by tidal waters up to the line of mean high tide.

The Environmental Protection Agency reviews and comments on dredging projects in navigable waters in accordance with a memorandum of understanding with the Corps of Engineers, dated July 13, 1967.

The National Oceanic and Atmospheric Administration (through its National Marine Fisheries Service) has been vested with responsibility for participation in matters relating to marine and estuarine areas.

The Department of the Interior and its Bureau of Sport Fisheries and Wildlife has responsibility and authority under several statutes, including the Fish and Wildlife Act of 1956, the Estuary Protection

Conservation Act, the Fish and Wildlife Coordination Act, the Marine Mammals Protection Act, and various international treaties enacted to preserve, conserve, protect and enhance fish and wildlife resources and their habitat.

The Bureau of Sport Fisheries and Wildlife, with assistance from appropriate state and Federal agencies, including the National Marine Fisheries Service now reviews all applications to the Corps of Engineers for permits to construct pipelines in navigable waters and assesses their potential impact on fish and wildlife resources and the environment. When appropriate, the Bureau recommends to the Corps specific modification of project plans which are needed to reduce impact on these resources. Occasionally a project plan is so conceived that significant impact cannot be avoided, but at the same time, a satisfactory alternative may be available; in such cases, a recommendation that the permit not be issued would be appropriate. At least one court decision has indicated that the Corps of Engineers has the authority under the Rivers and Harbors Act to condition or deny a permit on the basis of environmental considerations. 1/

Much of the coastal lands outside of parks and refuges are privately owned, but wetlands that are below the line of mean high tide are subject to Federal regulation (as navigable waters) through application of the Corps of Engineers permit system.

1/ See Zabel v. Tabb, 430 F. 2n 199 (5th Cir. 1970).

Thus, Federal or state authorities or private land owners may require, depending upon circumstances and location, that pipelines be buried, that canals be backfilled where possible, that bulkheads be erected in marsh areas to prevent saltwater intrusion, the kind of dredging equipment to be used, the inclusion of shut-off valves, specific placement or disposal of spoil, or, in the case of a private landowner, that pipeline corridors be established.

The Bureau of Land Management has initiated a study to investigate the extent and character of damage to coastal resources from pipeline construction. This is a first priority project of the new environmental assessment team stationed in New Orleans. A preliminary report 1/, assessing the impact of the various phases of pipeline construction on coastal resources in the eastern Texas coastal zone, has been completed.

The second phase, or longer term portion of the study, will attempt to develop criteria for pipeline system planning for application in OCS areas which have not been subjected to extensive mineral development. High priority will be given to developing criteria for the protection of bottom and shoreline resources in this study.

In addition, an interagency study is being initiated to explore the feasibility of pipeline corridors on the OCS and in coastal marshes.

1/ Bureau of Land Management, New Orleans OCS Office, 1973, Preliminary Environmental Assessment and Impact Analysis of Potential Gas and Oil Pipeline Construction in the Galveston-Sabine Pass Area, Texas, U.S. Department of Interior.

Private industry has also initiated a study of pipeline effects in marsh areas. The Offshore Pipeline Committee 1/ contracted with Battelle Laboratories to conduct a systematic, comprehensive study of the environmental effects of gas pipeline construction and operation in the Gulf Coast region with emphasis on the Louisiana marshlands. The study, which is now complete, is an attempt to document existing knowledge on environmental effects of pipeline construction and operation, to identify gaps in existing data, and to state conclusions, based on present knowledge, concerning the impacts of pipelining in the marshlands. The final report resulting from this study 2/ presents a description of gas pipelining operations, and of the natural and socio-economic environment, and analyzes the effects of gas pipelining on the physical, biological, and socio-economic facets of the environment.

1/ The Offshore Pipeline Committee is composed of ten interstate gas pipeline companies.

2/ McGinnis, J. T., et. al., 1972. Final Report on Environmental Aspects of Gas Pipeline Operations in the Louisiana Coastal Marshes to Offshore Pipeline Committee. Battelle, Columbus Laboratories, Columbus, Ohio.

D. Other Mitigating Measures

1. Special Stipulations

Leases for oil and gas exploration and development are subject to all OCS operating regulations and orders. Additionally, in some cases the lease may include special stipulations which are considered necessary for the protection of a particular resource, or activity, such as the one presented in Part B. above. These stipulations can be designed to meet the needs of a particular resource, e.g., wildlife or waterfowl refuges, fishing areas, certain recreation areas, protection of archeological or historical values, etc., which might be quite sensitive to development of the lease. In this proposed sale, it is believed the following suggested lease stipulations will help mitigate potential impacts on the resources identified below:

- (1) It is proposed that the following stipulation be applied to any lease resulting from this proposed sale for the protection of historical, archeological, or architectural values:

"The lessee agrees that, prior to any drilling activity or the construction or placement of any structure for exploration or development on the lease, including but not limited to well drilling and pipeline and platform placement (hereinafter referred to as "operation"), he will conduct geophysical surveys sufficient to determine the possible existence of any sites, structures, or objects of historical or archeological significance that may be affected by such operations. Such sites, structures, or objects are hereafter in this stipulation included in the term "cultural resource." If these geophysical surveys indicate anomalies that suggest the possible existence of a cultural resource, the lessee will either: (1) have a qualified marine archeologist confirm or refute the existence of a cultural resource using such other equipment and survey techniques as may be necessary; or (2) relocate the site of such operations, so as not to disturb the area in which an anomaly has been identified; or (3) show how such operations, will not disturb the area in which an anomaly has been identified.

All data obtained in the course of the geophysical and any archeological surveys shall be submitted to the Supervisor with any application for drilling or other activity. If the Supervisor determines there are indications that a possible cultural resource may be affected by the proposed operation, he shall direct the lessee to utilize the services of a marine archeologist to survey the area unless an archeological survey has been completed.

Upon completion of any archeological survey, a report shall be forwarded by the Supervisor to the Manager, Gulf of Mexico OCS Office, Bureau of Land Management for review and recommendations. Should the archeological survey report indicate that a cultural resource may be affected by the operation, and the lessee chooses not to relocate, the lessee shall take no action that may result in the disturbance of the cultural resource until the Supervisor has given directions as to its disposition.

The lessee agrees that, if any cultural resource should be accidentally discovered after the completion of the archeological survey, he will report immediately such findings to the Supervisor and make every reasonable effort to preserve and protect the cultural resource from damage until the Supervisor has given directions as to its disposition.

(2) In addition, it is proposed that the following stipulation be applied to any lease resulting from this proposed sale for protection of the environment:

"The lessee shall have the pollution containment and removal equipment available as required by OCS Order No. 7 of August 28, 1969, as may be amended. After notification by the Operator to the Supervisor of a significant oil spill as defined by OCS Order No. 7, or an oil spill of any size or quantity which cannot be immediately controlled, the operator shall immediately deploy the appropriate equipment to the site of the oil spill, unless, because of weather and attendant safety of personnel the Supervisor shall modify this requirement."

2. Notices to Lessees and Operators

These notices have the same effect or status as OCS Operating Orders and Regulations and are used when expeditious clarifications or corrections and additions to existing orders and regulations

are necessary. By issuing Notices to Lessees and Operators, the extensive amount of time necessary to amend and republish orders and regulations is avoided. One example of a Notice, issued 11 Dec. 1972, explains and details conditions for approval of waste water (oil field brines) disposal from OCS offshore facilities. This Notice provides that such discharges shall meet applicable EPA or state standards for effluent limitations, whichever are more stringent, and provides for certain monitoring activities. The ban on offshore use of PCB's was implemented by such a Notice.

3. Departures

A departure (waiver) from OCS orders or other rules of the GS Supervisor may be granted when such a departure is determined to be necessary for (30 CFR, 250.12(b)):

- a) the proper control of a well,
- b) conservation of natural resources,
- c) protection of aquatic life,
- d) protection of human health and safety,
- e) protection of property, or
- f) protection of the environment.

Waivers are technically based decisions and are granted in situations only where expert judgment determines that better, safer operations would result from operations under the waiver.

4. Research on Advanced Technology

EPA and Coast Guard are conducting research on more efficient containment and recovery devices (booms and skimmers). The

efficiency of booms and skimmers depends on sea state and spill conditions but in any case are never 100% efficient. When the results of these studies, and any other similar studies so indicate, the requirement for use of better techniques and equipment will be incorporated into the OCS regulations and orders as appropriate. If incorporated, the requirements will be applied to all leases.

5. Geophysical Information

The Conservation Division of the GS is aware of the near-surface structural configuration and its effect on drilling, fixed-structural emplacements, pipelines, etc., relative to the proposed lease tracts. Knowledge of near-surface structural conditions is fundamental to a sound lease management program for the OCS.

Geophysical data, which show the shallow structural and sedimentary environment, are used to predict, and thus minimize, any geologic hazards to drilling operations and consequent possible dangers to the environment, from pollution. Surface and shallow subsurface geologic strata, seldom create insurmountable obstacles to a minimal risk program of exploration and exploitation of economically attractive structures.

High resolution geophysical data covering all tracts to be offered for sale will be purchased and analyzed by GS geophysical personnel. These data, in the area of coverage, provide definitive information on (1) thickness of the unconsolidated sediments (0-300 feet); (2) structural configurations on shallow seismic horizons (300-500 feet below ocean bottom); (3) sea floor anomalies, mud mounds, mud waves

or potential slide areas; pipeline and other objects on the sea floor, and bore hole locations as interpreted from a combined analysis of several geophysical measurements, and (4) bathymetry.

Information from these high resolution data are extremely useful in detecting shallow geologic hazards such as potentially unstable bottom conditions (mud waves, etc.), shallow faults, and in some cases, near-surface gas pockets. When these features are identified prior to drilling operations, or platform construction, the operator is notified so he can take the necessary action to assure that his operation is conducted with maximum safety. This is a necessary part of an effective OCS lease management program.

High resolution geophysical data usually are not gathered until the tracts to be offered for lease are announced and therefore, they are not available at this time to contribute to a preliminary near-surface analysis; however high resolution data will be available prior to the sale date to support both pre- and post-sale lease management activities.

The latest interpretation of high resolution bottom profile data will disclose any bottom and/or subsurface conditions that might pose special environmental hazards for drilling or producing operations in the Louisiana offshore area, and these will be made available to the Bureau of Land Management OCS Manager prior to his decision to issue a lease and to the Geological Survey Area Supervisor prior to his approval of drilling operations. The District Engineer, Geological

Survey, will prohibit the location of platforms on areas of instability should the need arise, through his authority to issue or not issue permits for platform placement.

6. Conservation Practices

The Oil and Gas Supervisor, in the interest of conservation, is authorized pursuant to the Code of Federal Regulations, to approve well locations and well spacing programs necessary for proper development giving consideration to such factors as the location of drilling platforms, the geological and reservoir characteristics of the field, the number of wells that can be drilled economically, the protection of correlative rights, and the minimizing of unreasonable interference with other uses of the Outer Continental Shelf. The Supervisor draws his authority from the following regulations and OCS operating orders:

30 CFR 250.11 outlines in broad terms the Supervisor's authority to control development of the OCS to protect the environment, and to obtain maximum economic recovery of mineral resources under sound conservation practices.

30 CFR 250.16 authorizes the Supervisor to specify the permissible production of a well. Thereafter, OCS Order No. 11 establishes the production rate control at the Maximum Efficient Rate (MER) of the well or reservoir. MER is defined in OCS Order No. 11, see Attachment G.

30 CFR 250.17 dealing with well spacing authorizes approval of well locations, platform locations, and lists factors for consideration in this regard.

30 CFR 250.30 requires lessee's compliance with OCS Orders as well as general regulations and demands all necessary precautions to prevent damage, waste, and injuries.

30 CFR 250.34 requires the lessee to submit to the Oil and Gas Supervisor exploratory drilling plans, lease development plans and applications for permits to drill prior to these drilling programs. The Oil and Gas Supervisor utilizes well information such as electric well logs, core information from other wells previously drilled in the vicinity of the proposed drilling program and geological and geophysical data and other pertinent reservoir information to determine the proper number of wells necessary for development.

30 CFR 250.50 grants the Director authority to demand pooling or unitization which the Secretary is authorized to require under the OCS Lands Act in the interest of conservation.

30 CFR 250.51 refers to the unit plan regulations contained in 30 CFR 226 with regard to obtaining approval of units or cooperative agreements.

30 CFR 250.52 lists purposes for which the Supervisor may approve pooling or drilling agreements.

7. Other Requirements

In addition to the Interior Department's requirements, the operator must comply with applicable navigation and inspection laws and regulations administered by the U. S. Coast Guard. These relate to safety of personnel and display of prescribed navigational lights and signals for the safety of navigation. Permits to install islands and fixed structures and the drilling of wells from mobile drilling vessels must also be obtained from the U. S. Army Corps of Engineers, which is authorized by the OCS Lands Act to prevent obstruction to navigation. The decision as to whether a permit will be issued by the Corps of Engineers is based on an evaluation of the impact of the proposed work on the public interest. Factors affecting the public interest according to the Corps of Engineers include, but are not limited to, navigation, fish and wildlife, water quality, economics, conservation, aesthetics, recreation, water supply, flood damage prevention, ecosystems, and, in general, the needs and welfare of the people. Pipeline construction must also be in compliance with

standards established by the Office of Pipeline Safety, Department of Transportation. The Department of Labor establishes Occupational Safety and Health Standards which are applicable to OCS operations.

Operators must comply with requirements of the Federal Water Pollution Control Act Amendments of 1972 (P. L. 92-500; 86 Stat. 816) which establishes a National Pollutant Discharge Elimination System 40 CFR Part 125, 38 F. R. 13528 (1973). This system applies to discharges on the OCS from any point source and requires any person to obtain a permit from the EPA for the discharge of any pollutant as defined by the Act. Discharges of any pollutant without the necessary permit from EPA is made unlawful by the Act. Pursuant to section 501(b) of the Act, the Department of the Interior has suggested to EPA that the feasibility of a memorandum of understanding between the two agencies be considered in order to facilitate the administration of the NPDES as it applies to discharges arising from OCS lease operations and to minimize any redundancy of efforts by the Geological Survey and EPA. The feasibility is currently still under consideration.

VI. UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

As described in Vol. 1, Sec. III. B. of this statement, certain features of oil and gas operations cause adverse effects which may be considered unavoidable in the light of current operation practices, technology, and regulations. A capsule summary of the significant effects from this sale are identified below. In addition, although oil spills resulting from this proposed sale can in general be avoided, some of the effects of an oil spill, if one should occur, are considered unavoidable and are also discussed below.

A. Effect on Marine Organisms

Several oil and gas operations result in temporary increases in turbidity. These operations include the discharge of drilling fluids and the excavation of pipeline trenches by jetting and dredging. When turbidity is generated near the water surface, the depth of penetration of sunlight is diminished. This leads to a decrease in the output of the photosynthetic mechanism of the phytoplankton. The dimensions of the area affected are small and consist of a plume hundreds of yards in length. The duration of the turbidity in a given location will be several hours if the source is pipeline burial operations, and several weeks to several months if the source is drilling fluid discharge. The effect of any decrease in primary production must be considered adverse. The area involved is very small and any reduction would only occur locally and would not involve the entire population of marine organisms.

Clogging of respiratory surfaces and filter-feeding mechanisms could reach a severe level in the benthic animals, however. The result of turbidity will be physiological stress, and possible mortality. This impact will be encountered during pipeline jetting operations and will be restricted to the downstream direction of the ocean current. The duration of the impact in a given area will be no longer than a few hours, but if it occurs in shellfish beds and similar concentrations of organisms the impact would be considered adverse.

Beneath every platform where wells have been drilled is an expanse of cuttings, released during drilling, which has buried and smothered all non-motile benthic forms below it. If it is different in texture and composition from the surrounding sediment, it will not likely be colonized by local forms.

Exposure of biota to harmful or toxic materials released into the marine environment or coastal marsh such as from accidental spills of crude oil, fuel and solvents, and the routine discharge of formation waters will bring about an adverse effect if this occurs. The effects of heavy concentrations of crude oil and petroleum derivatives, depending on their composition, consists of lethal toxicity, sublethal effects, coating with weathered oil, behavioral changes, and habitat changes. The more subtle effects of light contamination may be serious also, but are not well understood at this time. Some specific types of this effect are:

1. Marine phytoplankton have been shown to suffer stress and mortality when exposed to oil during laboratory experiments.

2. Copepods have been found ingesting and passing oil droplets without apparent harm. The copepods, however, serve as an important link in the food chain between phytoplankton and larger animals and ingested hydrocarbons are therefore passed on to larger organisms.

3. All marine plankton present near the core of the plume of formation water, before it is sufficiently diluted by sea water, will suffer stress or mortality from concentrations in the plume. This adverse effect will be immeasurably small at the population level.

4. Laboratory experiments show that fish may be killed during the egg and larval stage after exposure to crude oil. Respiratory surfaces become clogged and damaged in juvenile and adult stages. These effects would occur if spills come in contact with eggs and larvae in the breeding zones.

5. In the event of an onshore oil pipeline leak or spillage on onshore facility, vegetation would be affected according to the severity of the spill. A small leak may do little damage. A severe leak however, may contaminate the substrate and kill the vegetation that comes into direct contact with the oil and several years may be required for recovery. Small animals in contact with the oil would likely be killed.

6. Although large numbers of bird deaths have not been a feature of past oil spills in the Gulf of Mexico, the probability is high that if a large spill comes ashore in the western Gulf, that large numbers

of shorebirds, wading birds, and waterfowl will be killed-- an exceedingly adverse impact.

Although the potential for harm is present, the inability to predict accidental oil spills makes an assessment of the scope of the effect on birds uncertain.

Damage to immobile, attached, and rooted organisms during excavation and reworking of sediments and soil, and suspension of sedimentary materials can occur from entrenching of subsea pipelines, burial of pipelines through beach and where applicable, adjacent coastal wetlands. During emplacement of subsea pipelines, sediments and benthic animals are washed out by hydraulic jetting. Softer life forms are likely killed, others are made vulnerable to predation, and in immediately adjacent areas of down stream ocean currents, some burial and smothering could be expected. The effect is limited to local areas around drill holes and pipeline paths. In these areas, the effect is adverse and unavoidable.

B. Wetlands and Beaches

Disturbance of beach and wetlands biota during pipeline burial by the trench and backfill method, uproots all plants and non-motile animals in the path of the pipeline, leaving a barren strip several feet wide. Some slight damage may also be rendered to vegetation in adjacent areas by machinery used in the operation. The effect is localized, but adverse for the smaller organisms destroyed.

If an oil spill impacts upon a beach then there will be an adverse effect, which may last from weeks to several years or more, depending on the amount of oil and size of the area impacted. Heavily contaminated beaches will be rendered unsuitable for recreation so long as they remain contaminated with oil. If mechanical means are employed in beach clean-up operations (bulldozers, front end loaders and other earth moving equipment) as was done following the Santa Barbara and Arrow oil spill incidents, then shoreline equilibrium may be upset by beach removal. Excessive removal of beach materials can lead to erosional problems unless enough sand and gravel, or other suitable replenishing material is available to replace the removed beach materials.

C. Deterioration of Air Quality

Air quality will not be seriously impaired by routine operations, however, degradation could result from several types of accidents.

If a natural gas leak or gas well blowout should occur, degradation would be minimal. Pollution would be mostly from methane which quickly disperses and drifts away. If a fire results, pollutants would be largely carbon dioxide and water vapor.

Oil leaks and oil spills not accompanied by a fire, would introduce highly volatile, low molecular weight hydrocarbons, such as benzene - and toluene, into the atmosphere. These lighter fractions of crude oil would undergo some unknown degree of degradation, but resultant photochemical smog is one possibility. If the spill results in a fire, large amounts of particulate carbon, and oxides of carbon, along with smaller but unknown amounts of sulfur oxides, nitrogen oxides, evaporated crude oil liquids, and partially oxidized compounds, would enter the air. Local air quality would be severely degraded during the period of the fire. This effect, should a fire occur, would be considered adverse and unavoidable.

D. Deterioration of Water Quality

Degradation of water quality by routine operations will be minimal. Brines added to sea water quickly diffuse into the water column.

Moderate to severe degradation would occur, however, in the event of an accidental oil leak or spill. The effects of water quality degradation on the biotic community would be the major concern if this occurred. As with all accidents the possibility exists, and if it

should occur, the effect would be adverse. In addition, water quality degradation will occur onshore if produced waste water is transported to shore for treatment and then discharged into fresh or brackish water systems which is the case when operators fail to follow state water quality standards.

E. Interference with Commercial Fishing Operations

As described in earlier sections, trawling operations suffer interference and inconvenience from oil and gas operations in several ways. A small portion, up to 0.3% of each tract leased, of sea floor is occupied by drilling rigs and platforms and is unavailable to trawl fishermen. Based on past exploration success rates, up to 1425 acres of sea floor may be occupied by platforms resulting from this proposed sale. Trawl nets, reportedly become snagged on underwater stubs and unburied pipelines, causing damage to, or loss of, the nets. Less frequently, large objects lost overboard off petroleum industry boats and platforms are caught in trawling nets, resulting in damage to the net and/or its catch of fish. The frequency of occurrence of this type of incident is unknown.

Although commercial fishermen could be expected to get out of the area of an oil spill, spilled oil could coat or contaminate commercial fish species, rendering them unmarketable. This would be another adverse effect to commercial fishing.

F. Interference with Ship Navigation

Very little interference can be expected between drilling rigs and platforms and ships that are utilizing established fairways. However, at night, and especially during rough weather, fog, and heavy seas, ships not navigating the fairways could collide with fixed structures. Also fishing boats engaged in trawling will be inconvenienced by having to navigate around fixed structures located on fishing grounds. Based on past exploration success rates, up to 200 new platforms could result from the proposed sale. Added to the 2,100 platforms now in the Gulf of Mexico the increment is small but still represents a potential increase in possible interference with shipping.

G. Damage to Historical and Archeological Sites, Structures and Objects

Prior to excavation, magnetometer surveys along proposed pipeline routes will detect some ferrous objects. Undetectable (i.e., wood) or as yet undiscovered sites, objects, or structures not detectable by such surveys could be damaged if they are in the path of pipelines. The incidence of this occurrence is considered to be low. Were it to occur it would be considered an adverse impact.

Other damage to archeological resources could come from oil contamination. Historical and archeological materials soiled by an accidental oil spill may not survive subsequent cleaning and restoration efforts. Porous materials could be rendered unsuitable for carbon dating

techniques. Although the probability of such an incident occurring does exist, the potential for significant historical resource destruction appears small, although it does exist.

H. Interference with Recreation Activities

Interference with recreation is closely related to degradation of aesthetic values. Oil contaminated beaches, freshly cut pipeline routes, terminals, and other onshore support facilities would normally be avoided by those seeking recreation sites for use or development. Disturbance of beaches by pipeline burial operations is very short-lived, relative to recreational use. Oiled beaches may require days, weeks, or years for adequate restoration depending on the initial severity.

I. Degradation of Aesthetic Values

It is possible that some portion of platforms and drilling rigs constructed or used on 78 tracts included in this proposal, and located 17 miles or less from the mainland or the barrier islands coastline, will be visible to the naked eye of a shoreline viewer. A few onshore pipeline terminals and treatment facilities will be constructed as a result of this proposed sale. If these objects interfere with residential or recreational vistas, the visual effect would probably be considered adverse. The incremental addition to what exists in the region is small, therefore, the impact is considered to be minimal. A number of the 78 tracts are seaward of uninhabited or non-usable coastlines, for instance, immediately off the Mississippi

River delta. Construction of platforms or rigs on these tracts will have little or no aesthetic impact.

Spilled oil and debris floating in the water or washed up on the beach would also detract severely from the scenic values of any local area. Before the natural terrain and vegetation has been completely restored, the effects of pipeline burial will appear as a large scar traversing the beach and coastal area. Restoration of the scar will require at least one year.

J. Conflict with Other Uses of the Land

If sited in agricultural areas, the construction of pipeline terminals, or other onshore facilities will remove temporarily small amounts of land from grazing or farming use. Interruption of farming activities until the following growing season usually results. The existence of pipeline terminal facilities would involve the permanent loss of up to several acres for grazing or farming, because each facility usually requires an access highway and is enclosed by a fence. A pipeline leak, however, involving the release of oil into farm land would render the land contaminated and unsuitable for grazing or other agricultural purposes. One to several growing seasons might be required for recovery of affected vegetation and degradation of spilled oil. The low probability of this occurring and the relatively small areas involved, indicate it is minor, although were it to occur it would be considered adverse.

K. Summary

In summary, all unavoidable adverse impacts that will be sustained by the natural environment as a result of routine operations will be relatively localized in their effects. Many will be followed by unhindered natural recovery within relatively short time periods. A massive accidental oil spill could result in severe and widespread damage of major consequence. Therefore, all the tracts identified for oil and gas production in this proposed sale do contain varying degrees of potential for adverse effects of several kinds. Only a massive oil spill accident is considered to result in significant adverse impact; the probability that such a spill will occur, however, is relatively low (see section III. A.).

VII. RELATIONSHIP BETWEEN LOCAL SHORT-TERM USE AND MAINTENANCE AND
ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The principal short-term use of the proposed sale area will be the extraction of oil and gas from those tracts which prove economically productive. This mineral extraction will contribute to the diminishment of the long-term productivity of the oil and gas resources of the Gulf of Mexico and possibly to marine and coastal resources.

Oil and gas have been extracted from Louisiana OCS areas for many years, and, although no decrease in marine productivity has been detected, it is recognized that chronic low-level pollution from oil and toxic chemicals may impact adversely on long-term productivity. It is possible that development of the incremental OCS area in this proposed sale will result in degradation of long-term productivity, but the long-term effects of low-level pollution are not clearly understood at this time.

The additional stress which the ecosystem can absorb is limited, but at present, the bounds of these limitations are not known. St. Amant observes, "Certainly the significance of the continual addition to, and accumulative effect of, sublethal pollutants in the environment is probably the most important ecological question facing us today." 1/

It is not anticipated that other impacts not mentioned above caused by oil and gas operations will decrease either short-term or long-term productivity of the ocean.

1/ St. Amant, Lyle S., "Biological Effects of Petroleum Exploration and Production in Coastal Louisiana", Louisiana Wildlife and Fisheries Commission, December 1970, p. 20.

Disturbance of coastal land by pipeline construction and burial operations and construction of related onshore facilities will decrease productivity in the short-term only. Productivity of coastal lands in the area disturbed by pipeline operations will actually increase following the disturbance, and will fall off to natural levels as original conditions are restored in subsequent growing seasons. During the restoration period, light grazing or farming pressure most likely will not have any effect, but heavy grazing or farming could serve to keep the disturbed area from recovering at an optimum rate. Species diversity in the disturbed area will be low during the recovery period.

Based on past leasing and exploration experience, as many as 200 new platforms will be constructed as a result of this proposal. More and more structures are required as OCS production increases, and although concomitant cessation of production in older fields results in removal of some platforms, the cumulative impact of structures on multiple-use of the OCS is a point of concern. The cumulative impact of structures as hazards to commercial shipping, and as obstruction to commercial fishing activities, represents a conflict that can be controlled through proper planning and coordination with the appropriate Federal and state agencies and private industry. Some leveling out in the number of platforms is expected as older fields become inactive or hydrocarbon production decreases. This is also true with regard to the cumulative numbers and length (in miles) of

pipelines coming ashore. In the case of pipelines, as more and more areas begin to approach termination of production, some additional capacity will be available in existing pipelines to carry production from new areas thereby reducing the numbers of new pipelines required from subsequent lease sales. We are unable to determine at this time if the total number of platforms and pipelines required to develop the OCS areas in the Gulf of Mexico has peaked, but indications are that conditions are approaching a leveling off point.

From the information at hand, long-term productivity of the Gulf environment, we believe, is not being reduced.

VIII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

A. Mineral Resources

Leasing of the proposed tracts in this sale would permit development and extraction of the minerals contained therein. This lease sale could result in production of between 300 and 700 million bbl. of oil and 5 to 11 trillion cubic feet of gas which would represent an irreversible and irretrievable commitment of mineral resources.

B. Land Resources

It has been estimated that there will be expansion of onshore facilities as a result of this proposed sale. Some new pipelines will be required offshore and it is possible that one new pipeline may have to come ashore (industry estimate), with an appropriate terminal. Geological Survey has estimated that 0-5 new onshore terminals will be necessary to handle the anticipated production from this proposed sale. Any onshore or coastal zone construction would involve the irretrievable commitment of several acres of coastal lands for driveways and station or facility sites.

C. Fish and Wildlife Resources

An irreversible for irretrievable commitment of fish and wildlife resources and their habitats could occur in the area of a massive oil spill or if frequently subjected to chronic low-levels of oil pollution. At this time, there is insufficient evidence to conclude that low-level spillage has led to an irreversible commitment of fish and wildlife resources but there is enough evidence to indicate that this is a possibility that deserves close attention, and constant study.

IX. ALTERNATIVES TO THE PROPOSED ACTION

A. Hold the Sale in Modified Form

1. Details of Tract Selection Process for Proposed Louisiana Sale

The Louisiana call for nominations resulted in approximately 5,300,000 acres (1100 blocks) being nominated by 28 companies out of over 17 million acres available. ^{1/} The 5,300,000 acres were reduced to a logical, reasonable sale size (approximately 1.4 million acres), as determined by present Departmental guidelines to lease 3 million acres per year.

Three primary leasing objectives or Departmental goals have been established for the OCS program. These objectives are: orderly resource development, protection of the environment, and receipt of fair market value. These three objectives are necessarily broad, but require specific application in the tract selection process.

These general categories were specifically applied as follows:

a. Nominations and Past Leasing History

The weighted nominations, history, and other pertinent data were reviewed by the BLM New Orleans Office.

The nominations were analyzed to identify implied geologic structures, the history analyzed to determine if interest in specific tracts had increased, lessened or was the same as to nominations received in the past.

^{1/} The approximate total unleased acreage of Federal land offshore Louisiana between State waters and the 600 meter isobath.

b. Geology

On January 8 a meeting was held between BLM New Orleans and GS Metairie to discuss tracts which BLM had previously identified to GS as initial recommendations. GS had reviewed the tracts using available geological and geophysical data.

In the great majority of cases their data confirmed the initial recommendations as determined by analysis of nominations.

In cases where there appeared to be a difference between interest, as expressed by nominations, and GS data, specific structural maps which GS had available for the proposed sale area were reviewed. These maps, for the most part, consisted of small scale composite structural maps (approximately 1" to 3 miles). Also, specific wells which potentially affected some of these blocks were discussed as to amount and type of production, if any. In some cases where larger scale field maps were available (approximately 6" to 3 miles), these were also used by GS in their presentation to BLM.

c. Environmental Considerations

The preliminary environmental analysis was presented in the general form of physical, resource and socio-economic profiles, using map overlays and written documentations.

The categories of information presented include:

1. Ocean currents and Winds
2. Basic Geology
3. Bottom Sediments
4. Hazards
5. Outdoor Recreation
6. Sport fishing
7. Commercial Finfish
8. Commercial Benthos
9. Commercial Shrimp
10. Threatened Species
11. Upland Wildlife
12. Upland Birds
13. Waterfowl Concentrations
14. Livestock and Grazing
15. Transportation
16. Lands and Waters of Ecological Importance
17. Lands "Suitable" for Development
18. Socio-Economic

The above basic information was then interpreted as to the potential impact on, or hazard to, the individual resource from offshore drilling and development, pipeline construction and oil spillage. From these interpretations "potential environmental hazard zones" were developed for use in the tract selection process.

Other factors considered were as follows:

d. Special Considerations

(1) Defense Warning Areas

No warning zones were identified which affected the area so no possibility of conflict between leasing and warning area uses was considered.

(2) Sales Size

Departmental guidelines, based on supply-demand and potential reserve estimates, have established approximately 1,400,000 acres as the sale size. The tract selections in this case conform to those guidelines.

(3) Deepwater Tracts

Our selection of "deepwater" tracts totalling approximately 430,000 acres is deemed appropriate within the tract selection guidelines.

All so-called "deepwater tracts" selected are logical extensions of adjacent acreage in the older mapped area and should provide no insurmountable problems for exploration and production.

(4) Other

Consideration in tract selection was given to economics, including industry economics, national economics, and regional economics.

The high industry interest in offshore Louisiana, measured by level of nominations, expresses industry's desire to explore and develop this area. Special attention was given to tracts receiving a large number of nominations because this is an indicator that several companies view these tracts as having economically feasible production potential. For this reason, number of nominations received is always an important factor in tract selection.

The proposed leasing of Louisiana tracts is an item on the tentative five-year schedule. The schedule attempts to relate timing, size and location of each sale to the projected national needs for hydrocarbons. Production from this area would, to an extent, lessen our import needs and thereby ease the balance of payments strain. As to the choice of specific tracts in the tract selection process, the objective of orderly resource development received high priority. An attempt was made to select desirable tracts over a large area so that if and when they are leased, our geologic information and knowledge of type and extent of production will be greatly increased for planning future sales.

The economic and institutional factors taken into consideration in the tract selection process for OCS Sale No. 36 are contained in the regional economic and land use profiles developed by the Regional Planner in the Division of Environmental Assessment. This treatment is a part of the environmental profiles developed for the entire Gulf of Mexico by the New Orleans Office.

Factors considered include regional refining capacities and present production, transportation and processing facilities.

In summary the tracts selected for further consideration for leasing and analyzed for potential environmental impact in this statement are believed at this time to have the highest geologic potential for oil and gas production, highest estimated reserves and offer the most efficient resource exploitation. The potential environmental impact of leasing these tracts has been previously described in this impact statement.

2. Sale Modification Alternatives

a. Delete Tracts

The proposed sale could be modified by offering only those tracts estimated to be gas producing and would avoid some of the potential adverse environmental effects related to this proposed sale. It would eliminate or significantly reduce the potential hazard to the environment from possible oil pollution events that could result from this sale as proposed.

With this modification, the proposed sale could go forward with very little, if any, adverse impacts expected as a result of oil pollution on the marine and coastal environments, the resources, and related activities of the area offshore.

Elimination of these tracts would result in the loss to this sale of the 300-700 million bbl. of the estimated recoverable reserves for oil which would have to be made up from some other source.

However, development of gas prone tracts only would still require seismic exploration, exploratory drilling, construction of permanent platforms and pipelines, production well drilling, workovers, maintenance and repair work with the attendant potential adverse environmental impacts discussed in detail throughout this environmental statement for those activities. If this alternative is followed, the overall importance associated with these activities with regard to the environment would be essentially the same as it would be if all the proposed tracts were offered. However, the magnitude of potential impacts would be reduced and the cumulative impacts associated with quantities of waste water effluents and debris, and the numbers of platforms and pipelines required to develop gas prone tracts only would be lessened. With this alternative the environmental effects of pipelines, as previously discussed, would apply, but instead of a maximum of 1300 miles of pipelines needed to develop the tracts, possibly only 1000 miles would be required.

Another alternative would be to delete tracts strictly on the basis of depth. If all tracts in water depths of 200 meters or beyond were deleted, 430,000 acres would be eliminated.

The environmental impact of this possible modification would be to reduce the risk of oil spills from two sources: 1) the normal risk associated with standard operations, and 2) the additional incremental risk associated with development in deep water, for which technology has not been fully tested. Deletion of deep water gas tracts would insignificantly alter the potential environmental impact of the entire proposed sale.

An additional consideration regarding the technology of deep water operations is that, since deep water tracts have been offered and leased previously (Louisiana General Lease Sale #33), deep water tracts should not continue to be offered until industry develops these presently leased deep tracts, and shows that operations can be conducted there in an environmental responsible manner.

The environmental impact of offshore platforms would be reduced if only those tracts shallower than 200 meters were offered. This derives directly from the fact that fewer platforms would be erected as a result of this sale, a situation similar to that previously discussed concerning the deletion of all oil or oil and gas prone tracts.

In any case, the potential environmental impacts of oil spills and platforms as discussed in Section IV of this statement apply to this alternative (of deleting all tracts deeper than 200 meters) as a diminution in risk of oil pollution events (from those deep water tracts that are oil or oil and gas prone) and a diminution of the cumulative impact of development of all these tracts.

Tracts could be deleted which are identified by matrix analysis to have the highest potential for environmental degradation of natural resources. Most of the tracts (except for a few that are far from shore in lightly fished areas, see Section IV.M.3.) that are oil or oil and gas prone are identified as having moderate or high risk potential for environmental damage. A total of 38 tracts are tentatively considered at this time to have high environmental risk potential as defined in this impact statement. Of those tracts that are considered to have moderate environmental risk potential some are relatively higher than other principally due to closer proximity to specific resource areas and use conflicts.

The tracts tentatively identified as highly hazardous and any specific number of the moderately hazardous tracts could be eliminated from the sale and this would correspondingly reduce the overall potential environmental impact of the proposed sale. Elimination of any tracts, however, would result in the loss from this sale of estimated recoverable reserves of oil and gas which would have to be made up from some other source.

b. Substitute Tracts

Tracts with relatively lower potential environmental risk could be substituted for those of higher potential risk. Such action would not necessarily result in less total activity or environmental effect since more acreage and blocks would be required to meet minimum resource estimates. This would result in more exploratory drilling, more platforms constructed, additional miles of pipelines required and a substantial increase in production activities with attendant increase in potential adverse environmental impacts discussed in detail throughout this environmental statement for these activities.

In all probability potential environmental benefits of substituting tracts with lower environmental risk and lower resource estimates may not be realized due to increased acreage and exploratory activity required.

B. Withdraw the Sale

In addition to modification of the proposed sale, all tracts could be withdrawn from leasing consideration. A decision to withdraw the sale completely or to seriously limit the number of tracts to be leased would diminish the contribution of OCS gas and oil toward meeting future energy demand, and would subsequently necessitate development of alternative sources of energy, with their associated environmental impacts. These impacts can be found in the assessment of possible short-term alternatives on the following pages.

The production from tracts projected for leasing at this sale would contribute significantly to meeting domestic energy needs in the short run (5 to 15 years). Research on alternatives for the long term is being accelerated. FY 74 and FY 75 funding for research and development is shown in a later section.

The following is a list of energy sources or actions which might be considered as short term alternatives to offshore oil and gas:

1. Energy conservation
2. Conventional oil and gas supplies
3. Coal
4. Synthetic sources of oil and gas
5. Hydroelectric power
6. Nuclear power
7. Energy imports

8. Other energy sources

9. Combination of alternatives

Discussion of each short term alternative includes a brief general description and then factors related to the contribution the alternative could make if the proposed sale were not held. A more detailed and comprehensive discussion of these energy sources, long term sources, and energy conservation may be found in Energy Alternatives and Their Related Environmental Impacts, ^{1/} which reviews technology, state of development, resource base, supply and demand, costs and prices, and environmental impacts of each source.

Limitations on the substitutability of alternatives for OCS oil and gas include technology, high development and production costs, and time lag before the alternative could be a viable technical option. In early stages of development of an alternative source of energy, it may serve more as a supplement than as a substitute. Furthermore, there are some cases in which substitutability is diminished because of the projected use of the offshore oil and gas.

The discussion of these alternatives as presented below includes a consideration of the possibility of energy conservation as a method which might decrease or eliminate some of the energy requirements

^{1/} U.S. Department of Interior, Bureau of Land Management, Dec. 1973.

to be satisfied by this sale. The following table shows the equivalents which will be used in this discussion. When production has stabilized, the proposed Louisiana sale No. 36 may yield 70 to 125 thousand barrels a day of oil and 1 to 2.2 billion cubic feet a day of natural gas. Using common conversion factors, this level of production is first expressed in Btu's and then in terms of other important energy sources. The electrical equivalents were determined by considering two cases. The maximum requirement for generating capacity would result when the substitution of electrical energy for oil and gas occurred at the end use point. The minimum case is the result of substituting electrical energy produced by an alternative source for the electrical energy produced by OCS oil and gas.

Energy Needed From Other Sources to Replace The Expected
Oil And Gas Production From The Proposed Louisiana OCS Sale #36

1. Btu Equivalents ^{1/} in billions of Btu's per day

Oil -	70,000 to 125,000 bbl/day	406		725 billion Btu/day
Gas -	1 to 2.2 bil. cu. ft./day	= $\frac{1032}{1438}$	to	$\frac{2270}{2995}$

Total

2. Oil Equivalents in barrels per day

Oil from other sources needed to
directly replace expected oil production
from Louisiana sale #36 70,000 to 125,000 bbl/day

Oil from other sources needed to replace
expected gas production from 178,000 to 391,000
Louisiana sale #36

Total 248,000 to 516,000

1/ Conversion factors used:

1 barrel of oil = 5.8×10^6 Btu

1 cubic foot of natural gas = 1,032 Btu

1 ton of coal = 24×10^6 Btu

1 kilowatt hour = 3,412 Btu at the theoretical conversion rate of other energy forms to electricity at 100% efficiency.

3. Gas Equivalents in billions of cu. ft.
per day

Gas from other sources needed to
replace expected oil production
from Louisiana sale #36

0.4

to

0.7 bcf/day

Gas from other sources needed to
directly replace expected gas
production from Louisiana sale #36

1.0

to

2.2

Total

1.4

2.9

4. Coal Equivalent in thousands of short
tons per day

Coal

60

to

125 thousand short tons/day

5. Electrical Equivalents in thousands of
megawatts of
capacity

Substitute for end uses 1/
Substitute as input to electricity
generation 2/

14.3

to

29.7 thousand Mw

8.8

to

18.3 thousand Mw

1/ Based on a 65% average efficiency of end use of oil and gas (such as oil and gas heating) and a plant load factor of 80%.

2/ Efficiency of fossil fuel electricity generation was assumed to be 40%.

1. Energy Conservation

The shortage of oil and natural gas in the past few years has been reflected in curtailment of deliveries under existing contracts, inability to secure immediate and assured long term supplies, and denial of service to existing and prospective customers. The recent Middle Eastern oil embargo further reduced supply.

Any tradeoff between energy conservation and development of OCS resources must recognize several factors: the widening gap between supply and demand for energy from all sources in the near future, the immediate shortage of natural gas and the need for oil to accomodate some of the unfulfilled demand for gas, and the limitations from the point of view of technology, cost and time lag on substitution of other energy sources for oil and gas. The shortfall in present and projected energy supply greatly exceeds the estimated production from the proposed sale. Energy conservation measures and development of the OCS both have an important role in reducing U.S. dependence on imported energy.

2. Conventional Oil and Gas Supplies

Large reserves of oil and gas still remain in the U.S. The U.S. Geological Survey estimates that undiscovered recoverable reserves onshore are 135 to 270 billion barrels of oil and 605 to 1210

trillion cubic feet of natural gas. 1/ Improving technology and rising prices will enable development of previously uneconomical deposits and use of secondary and tertiary recovery techniques. However, discovery of the remaining reserves will be more difficult and expensive since larger structures have been studied extensively and the remaining reserves and harder to find.

To directly substitute for the proposed sale, onshore oil production would have to increase by 70,000 to 125,000 barrels a day and onshore gas production by 1 to 2.2 billion cubic feet a day. The mix of oil and gas that would provide the same Btu value as the estimated sale production ranges from all oil, 248 to 516 thousand barrels a day, to all gas, 1.4 to 2.9 billion cubic feet a day.

Economic incentives such as a rise in prices would be required to stimulate exploration and development in order to increase onshore production. Although prices of oil and gas have increased rapidly in the last year, it will be some time for price increases to be reflected in significantly expanded supplies of oil and gas. It is difficult to predict when and at what level oil and gas prices will stabilize. Current low exploration and discovery rates and declines in reserve levels must be reversed before production can begin to increase.

1/ Estimates calculated by the Geological Survey.

Alaskan North slope oil is not expected to increase supplies available to PAD Districts I-IV, which would receive almost all of the oil and gas from the proposed sale. Within the first few years of operation of the Trans-Alaskan Pipeline, all of the North slope oil would go to the West Coast (PAD V).

The environmental impacts of onshore oil and gas development may include land subsidence; soil sterilization due to oil, brines, and waste material released in blowouts, equipment failure, human error; disturbance of land by building road and structures; and pollution of ground and surface water due to poor well construction and spills. Impacts on air quality are usually minor and local.

Deregulation of the Wellhead Price of Natural Gas

The Federal Power Commission regulates the wellhead price of natural gas which goes into interstate commerce. It has been argued that prices established by the FPC have been too low, and have stimulated demand but discouraged exploration and development. Deregulation of the price of natural gas would allow prices to rise and thus stimulate exploration and production. However, in order for higher prices to result in higher proved reserves and production, promising prospects must be available. The OCS is one of the most promising areas for oil and gas development.

3. Coal

Coal is the most abundant mineral in the U.S. It has been mined in the eastern U.S. since the late 18th century, but emphasis is changing and the vast coal deposits of the Rocky Mountain region are growing in importance. The development of sulfur removal technology will play an increasing important role in the ability of coal industry to conform to government environmental, health, and safety regulations. About 46% of estimated remaining U.S. coal reserves contain 0.7 percent or less sulfur. Of this low sulfur coal, 93 percent is located west of the Mississippi.

Coal is mined in the U.S. by two primary methods: strip mining, also called surface or open pit mining, and underground mining. The mining method used depends largely on the amount of overburden overlying the coal seam.

To replace the expected energy from the proposed Louisiana OCS #36 sale (1.438 to 2.995 trillion Btu/day) with energy from coal would require the utilization of 22 to 46 million tons of coal per year. An increase of this magnitude could be supported by existing U.S. proved reserves. The primary constraints would be economic and environmental.

If this increased coal were provided by surface mining, it is believed that 4-9 mines of five million short tons annual capacity would be needed. One mine of this size would employ about 600 persons and have a capital cost of \$40 million. To supply the necessary incremental amount would require 2,400 to 5,400 employees and capital expenditures of \$160-360 million.

If underground mines were used, 11-23 mines of 2 million tons annual capacity would be required. Manpower for these operations would be 18,500 to 38,700 and capital expenditures would range from \$253 to \$529 million.

If the energy for this sale came from surface mined coal, the major consideration would be the amount of land disrupted. The following table gives an indication of how much land would be disturbed in the surface mining of 40 million tons/year.

Land Disturbed In Surface Mining Production

(Figures Based On 40 Million Tons Produced Annually)

<u>Coal Bed Thickness (feet)</u>	<u>Recovery Factor (%)</u>	<u>Coal Available (million Per Sq. Mile tons)</u>	<u>Area Disturbed Annually (Sq. Mi.)</u>
10	80	9.216	4.3
15	80	13.824	2.9
20	80	18.432	2.2
25	80	23.040	1.7
30	80	27.648	1.4
35	80	32.256	1.2
40	80	36.064	1.1
45	80	41.472	1.0
50	80	46.080	0.9

The primary environmental impacts of coal begin with coal mining. Underground mining may cause land subsidence. Strip mining and open pit mining disrupt large surface areas, causing destruction of the top soil, wildlife habitats, vegetation. Large volumes of mine wastes must be disposed of. Water quality problems may arise from damage to the ground water regime, acid mine drainage, and increased runoff and sediment loads in streams. Stripping increases the dust in the air. Combustion of coal, especially high sulfur coal, releases particulate and gaseous pollutants. Technology to control the pollutants is not completely developed.

4. Synthetic Sources of Oil and Gas

Oil Shale

The U.S. has abundant oil shale resources that have not been developed in the past because of availability of oil and gas from conventional sources at lower development costs. The major options for oil shale development are (1) mining followed by surface processing of the oil shale and shale-oil, and (2) in-situ (in place) processing. Oil shale can be mined either at the surface or underground.

The richest oil shale deposits in the U.S. are found in the Green River Formation in Colorado, Wyoming, and Utah. This region is sparsely settled and arid or semi-arid.

Limitations on the rate of development of oil shale include availability of operating personnel, environmental restrictions, lack of supporting commerce and industry, and construction logistics.

From 1944 to 1956, the U.S. Department of the Interior conducted extensive research on the mining and retorting of oil shale and refining of shale oil. For the past ten years, private industry has operated prototype plants and experimental facilities. As yet, there has been no commercial production of oil from oil shale.

An estimated 73% of oil shale lands, containing nearly 80% of the Green River Formation reserves, are federally held. The U.S. Department of the Interior, which manages these Federal lands, has initiated a prototype oil shale leasing program to make these rich deposits available for development by private industry.

Under this alternative the expected oil and gas from the Louisiana OCS sale #36 would have to be replaced by 248,000 to 516,000 barrels a day of oil produced from oil shale. Since the oil shale industry in the U.S. is in its earliest stages, it is difficult to predict the magnitude of impacts associated with a given level of production. The Department of Interior, in its Final Environmental Statement for the Prototype Oil Shale Leasing Program, estimated the impacts for the Green River Formation region.

Their estimates are based on a "unit tract" with a production level of 50,000 barrels daily for underground mines and 100,000 barrels daily for surface mines. Using these estimates, land requirement projections are given below for production of 400,000 barrels a day.

<u>Surface Mining</u>	<u>Land required, acres</u>
Mine development	120 to 340 yearly
Permanent Disposal, overburden	4,000 total
Temporary Storage, low grade shale	400 to 800 total
Permanent Disposal, processed shale	560 to 600 yearly
Surface facilities	800 total
Off-site requirements	720 to 2,400 total
<u>Underground Mining</u>	
Mine development	80 total
Permanent disposal*	220 to 600 yearly
Surface facilities	1120 total
Off-site requirements	1440 to 1800 total

*Upper estimate is for surface disposal of all processed shale.

Lower estimate is for underground return of 60% of processed shale.

The level of production needed to replace the proposed sale, 248,000 to 516,000 barrels daily, is considerably more than the projected development of the oil shale industry. The National Petroleum Council estimates production to be 150,000 barrels a day by 1980 in the most optimistic case. The Interior Department has projected that oil shale production by this date could reach 400,000 bbls./day. Even under the most optimistic conditions, production of shale oil is not expected to exceed 750 thousand b/d in 1985, 1/ assuming that syncrude "prices" are adequate to encourage commercial development. A spokesman for Colony Development, one of the companies with the most experience in oil shale, estimated that commercial oil shale production will not exceed 500,000 b/d by 1985. 2/

Development of feasible and economic in situ methods is important for eventual recovery of deeply buried oil shale resources in the Green River Formation. The technology of in situ (in place) retorting is less advanced than that of conventional processing (surface or underground mining, crushing, and above ground retorting).

1/ National Petroleum Council, U.S. Energy Outlook, Dec. 1972, p. 205.

2/ Platt's Oilgram, Dec. 3, 1973, Vol. 51, No 232, p. 1. statement by John Hutchins, V.P. of Cameron Engineers and Manager of Colony Shale Oil Plant. Testimony to the House Interior Mining subcommittee, Nov. 30, 1973.

Problems have included insufficient naturally occurring permeability, or failure to artificially induce permeability in order to permit heat transfer and passage of gases and liquids, and inability to remotely control the process with sufficient accuracy through well-bores from the surface. Additional problems if nuclear explosives are used are possible ground motion and release of radioactivity.

Environmental problems related to the extraction of shale oil by conventional (as opposed to in situ) retorting are magnified by the large volume of rock that would be processed in a commercial operation. A plant producing 100,000 b/d would probably mine about 130,000 tons of shale oil per day and would require disposal of a similar amount of spent shale. Surface disposal of the spent shale creates the problem of revegetation. Other problems are prevention of contamination of streams by saline water encountered in mining or by leaching of salts from spent shale.

The Green River Formation area is sparsely settled and arid or semi-arid. Development of an oil shale industry would change existing land use patterns and create a major socio-economic impact in a region now without large scale industry. It would also disturb regional wildlife. The Colorado oil shale lands have some of the largest migratory deer and elk herds in the world.

Roads, mining plant sites, waste disposal areas and utility and pipeline corridors would disturb the vegetative cover of the land and increase sediment loads in streams. The requirement of large amounts of waste water and the disposal of waste water with dissolved saline and organic compounds without degrading natural ground waters would place added stress on the scarce water resources of the region. Increased noise and a decline in air quality due to dust from mining and shale disposal and particulate and sulfur and nitrogen oxide emissions would accompany oil shale development.

Synthetic Natural Gas and Oil

Processes to convert coal and other feedstocks to various hydrocarbon liquid and gaseous substitutes for oil and natural gas have not yet reached commercial production in the U.S. although several commercial plants in western Europe use the Lurgi coal gasification process to produce low-Btu value gas. To date, more research effort has gone into development of coal gasification processes than into coal liquefaction, partly because of the availability of imported oil at lower cost than synthetic crudes. Natural gas can also be synthesized from petroleum. Such gas has been produced commercially in Europe and some forty plants are in the planning stage for the U.S. Feedstocks used range from naphtha and other lighter hydrocarbons to crude oil. Oil gasification does not add to overall energy supplies

but can increase short-term gas supply. However, the availability of light hydrocarbons and refinery capacity to produce feedstocks for these plants is questionable.

The main barriers to synthetic gas and oil development have been economics and technology. Most processes have not yet advanced beyond the pilot plant stage, have not been tested commercially, and have not been able to compete in cost with other energy sources. This situation is changing. Factors that will influence the development of coal gasification include availability of coal, environmental constraints on coal production and SNG production, capital availability, health and safety considerations in coal mining, and availability of water.

A typical coal gasification plant will produce 250 million cf/d of pipeline quality gas per day, consume 6 to 10 million tons of coal yearly, use about 6,000 gallons of water per minute, and have capital costs of over \$400 million, including the development of the coal mine. 1/

1/ Talk given at a coal seminar, August 21, 1973 at Price, Utah by Dr. Thomas A. Henrie, Bureau of Mines, Deputy Director, Mineral Resources and Environmental Development.

This alternative would involve a combination of synthetic oil and gas with a total value of 1.438 to 2.995 trillion Btu's, the energy equivalent of the oil and gas expected from the proposed Louisiana OCS #36 sale. The mix could range from all synthetic oil, 248,000 to 516,000 barrels a day (89.3 to 185.8 million barrels a year) to all synthetic gas, 1.4 to 2.9 billion cf a day (.50 to 1.04 trillion cf a year).

Complete substitution by coal gasification would require 6 to 12 250 billion Btu's per day coal gasification plants, 30 to 60 million tons of coal per year, and 10 to 20 coal mines. At an estimated \$250 million for each plant, these plants would cost \$1.5 to \$3.0 billion. Because of the present lack of a commercial synthetic gas industry and the uncertainty of the related economics and technology, SNG production projections are uncertain. Synthetic natural gas production does not add to overall energy supplies. Rather, it increases gas supply by converting other more abundant and less environmentally acceptable fuels to gas, providing flexibility of energy supplies.

The first environmental obstacle to coal gasification and liquefaction is coal retrieval. In addition, these processes must contend with water consumption and contamination, air pollution from sulfur

components and particulate matter, and possible noise and site pollution. Impacts on air quality stem from sulfur oxides, hydrogen sulfide, nitrogen oxide, ash, and ammonia. Technology to control these emissions is still under development.

5. Hydroelectric power

Conventional hydroelectric developments convert the energy of natural regulated stream flows falling from a height to produce electric power. Pumped storage projects generate electric power by releasing water from an upper to a lower storage pool and then pumping the water back to the upper pool for repeated use. A pumped storage project consumes more energy than it generates but converts off-peak, low value energy to high-value peak energy.

Most available sites for economical production of conventional hydroelectric power have been developed. The Pacific region has the greatest total conventional hydroelectric potential, and leads the other States in both developed and undeveloped capacity.

Alaska has the second highest potential, although less than one percent is developed. In many parts of the country there are numerous physical opportunities for developing pumped storage projects but only a limited number have been investigated.

Pumped storage is expected to account for a large part of projected additions to hydroelectric capacity in the next few decades.

Hydropower projects have multipurpose benefits, such as recreation, water supply, fish and wildlife enhancement, and flood control. These benefits may justify projects that would otherwise be uneconomic for a single purpose. Initial capital costs of hydropower projects vary greatly depending on location, size, and design. Operating expenses are low compared to other alternatives.

The hydroelectric generating capacity required to substitute for the energy from the oil and gas expected from the proposed Louisiana OCS #36 sale depends on whether the oil and gas is employed in direct end uses (such as oil and gas heating) or in electricity generation. Since direct uses convert oil and gas to energy more efficiently, a larger generating capacity would be required to substitute for this energy.

To substitute for end uses, capacity of 14 to 30 thousand megawatts would be needed. To substitute for the electricity which could be generated by the oil and gas, 9 to 18 thousand megawatts of capacity would be needed.

The extent of U.S. conventional hydropower potential east of the Mountain states, the region to be served by the proposed Louisiana OCS #36 sale, is shown below.

Region	Potential Power	Developed Capacity	Undeveloped Capacity
New England	4.8	1.5	3.3
Middle Atlantic	8.6	4.3	4.3
East North Central	2.2	0.9	1.3
East South Central	9.1	5.2	3.9
West North Central	7.0	2.7	4.3
South Atlantic	14.5	5.5	9.0
West South Central	5.1	2.1	3.0
Total	51.3	22.2	29.1

All units are thousands of megawatts.

Source: From "Hydroelectric Power Resources of the United States, Developed Undeveloped, January 1, 1973," Federal Power Commission, December, 1972.

The feasibility of hydropower as an alternative to the oil and gas expected from the Louisiana #36 sale is restricted by several factors. Hydroelectric power cannot be substituted for use of oil and gas in transportation and in industrial processes dependent on unique properties of oil and gas. Land use considerations may preclude development of the few promising potential conventional hydro sites east of the Mountain states. Sites where pumped storage projects may be developed are numerous but have not been systematically inventoried. Furthermore, few dams are built solely for hydroelectric power generation. Irrigation, navigation, municipal and industrial uses, and flood control are frequently more important than and not fully compatible with power production needs. Since hydropower is most often used to service peak loads, other energy sources must be relied on for base power loads.

Construction of a hydroelectric dam represents an irretrievable commitment of the land resources beneath the dam and lake. Inundation of the land eliminates wildlife habitat and precludes other uses such as agriculture, mining, and free-flowing river recreation. Some increase in erosion during construction and operation will occur.

Hydroelectric projects use a renewable resource and do not cause air pollution. On the other hand, use of streams for power may displace recreational and other uses. Water released from reservoirs during summer months may change the water temperature and lower the oxygen content of the river downstream, adversely affecting the fishery.

Fluctuating flow releases for peak load operation may also adversely affect fisheries and downstream recreation. The lack of satisfactory means of passing anadromous fish over high dams precludes development of some favorable hydroelectric sites.

Fish may die from gas-bubble disease if exposed to nitrogen supersaturated water. Nitrogen supersaturation results at a dam when excess river flow must be passed over the spillway. High nitrogen levels in the Columbia and Snake Rivers pose a threat to the salmon and steelhead resources of these rivers. The Corps of Engineers is studying this problem.

6. Nuclear Power

The development of nuclear energy represents an important advance in the electric power industry. The predominant nuclear system used in the U.S. is the uranium dioxide fueled, light water moderated and cooled nuclear power plant. Research and development is being directed toward other types of reactors, notably the breeder reactor and fusion reactors.

Installed nuclear capacity is now 25,000 MW. At the end of 1973, nuclear power generated about 5 percent of the Nation's electricity. However, about half of the electric power capacity under construction is nuclear powered. Nuclear power has been set back by delays in licensing and siting, environmental constraints, manufacturing and technical problems, and regulatory difficulties. Future capacity will be influenced by the availability of plant sites, plant licensing considerations, environmental factors, nuclear fuel costs, rate of development of the breeder and fusion reactor, capital costs. In order to meet future uranium requirements, an immediate increase in exploratory drilling activity will be required.

We have calculated the nuclear capacity required to generate electricity to substitute for OCS sale production for two cases:

- (1) all of the OCS oil and gas were used to generate electricity
- (2) all of the OCS oil and gas were devoted directly to end uses such as oil and gas heating.

Nuclear capacity required to substitute for the electricity which could be generated by the projected oil and gas from sale #36 would be 9 to 18 1000-MW plants.

Capacity required to substitute for end uses would be 14 to 30 1,000-MW plants. Associated parameters are shown for both cases, assuming model 1000-MW light water reactors.

	<u>9 to 18 1,000-MW Light Water Reactors</u>	<u>14 to 30 1,000-MW Light Water Reactors</u>
a. tons $U_{38}O_{10}$ first core fuels - first year only <u>1/</u>	5,220-10,440	8,120-17,400
b. thousands of tons of uranium ore required for a <u>2/</u>	2,610-5,220	4,060-8,700
c. tons $U_{38}O_{10}$ annual reloads without plutonium recycling	1,800-3,600	2,800-6,000

1/ Assuming 80 percent plant factor.

2/ Assuming 0.20 percent average ore grade.

	<u>9 to 18 1,000- MW Light Water Reactors</u>	<u>14 to 30 1,000- MW Light Water Reactors</u>
d. thousands of tons of uranium ore required for c	900-1,800	1,400-3,000
e. tons U_3O_8 annual reload with plutonium recycling	1,575-3,150	2,450-5,250
f. thousands of tons of uranium ore required for e	740-1,575	1,225-2,625
g. acres of land required for sites <u>3/</u>	15,000-30,000	23,500-50,000
h. thousands of gallons of radioactive wastes produced yearly	81-162	126-270

3/ Assuming an average of 1,500 acres per 1,000- MW unit for cooling ponds and 500 acres per site containing three 1,000-MW units.

Although nuclear plants do not emit particulates or gaseous pollutants from combustion, several unique environmental problems arise. Some radioactivity in the form of radiation, airborne radioactivity, and radioactive liquids, is released to the environment. Although the amount released is very small and potential exposure has been shown to be less than the average level of natural radiation exposure, special precautions are required to control these emissions. The possible release of radioactivity as a result of an accident must be anticipated in the design of the plant and its emergency systems. Malfunction of the emergency core cooling system has been of particular concern.

Nuclear plants use essentially the same cooling process as fossil-fuel plants and thus share the problem of heat dissipation from cooling water. However, light-water reactors require larger amounts of cooling water and discharge greater amounts of waste heat to the water than comparably sized fossil-fuel plants. The effects of thermal discharges may be beneficial in some cases. Adverse effects can be mitigated by use of cooling ponds or cooling towers.

Low level radioactive wastes from normal operation of a nuclear plant must be collected, placed in protective containers, and shipped to an AEC storage site and buried. High level wastes created within the fuel elements remain there until the fuel is spent. They are then isolated in a fuel reprocessing plant and stored in liquid or solid form at AEC facilities.

7. Energy Imports

Oil Imports

U.S. reliance on imported oil has increased steadily in the last decade. Competition on the world market and cutbacks in Middle Eastern oil exports have raised questions about availability of oil imports in the future. Declining resource availability and increasing domestic demand restrict potential imports from the Western Hemisphere, particularly Latin America. Increasing imports from the Middle East bring problems of security of supply, balance of payments, U.S. off loading terminal capacity, and refinery capacity.

To replace the oil and gas from the proposed sale would require oil imports of 248,000 to 516,000 barrels a day (89 to 186 million barrels a year). If 29,000 DWT tankers were used (the average size tanker calling at U.S. ports in 1972), there would be about one to three additional tanker unloading each day. If 60,000 DWT tankers were used, about one additional tanker would have to be unloaded every day.

Importing petroleum would have a negative impact on the United States balance of payments. Some of the factors affecting this impact are: the type of import, i e., crude oil, semi-refined products, or refined products; the price of imported oil; the exporting countries' propensity to import from the U.S.; the amount of U.S. capital invested

in the exporting country for production, transportation and terminal facilities, and the amount of U.S. goods and services used in the exporting country for these facilities; and the nationality of vessels carrying the oil. In the past, imported petroleum was generally less expensive than domestically produced petroleum. Recently, the price of foreign oil delivered to the U.S. has risen to a level equal to or greater than that of oil produced on the OCS.

The primary environmental hazard of increased oil imports is the possibility of oil spills. Spills can result from intentional discharge, accidental discharge, and tanker casualties. Intentional discharges would result largely from tank cleaning operations, which in 1969 to 1970 had an overall discharge rate of 0.074 percent of cargo. At this rate, import levels of 248,000 to 516,000 barrels a day would result in discharges of 184 to 382 barrels a day. In 1970 approximately 0.0015 percent of oil handled in the U.S. was accidentally released during transfer operations. At this rate, 4 to 8 barrels a day would be accidentally spilled. The worldwide tanker casualty analysis indicates that, overall, an insignificant amount of the total volume of transported oil is spilled due to tanker accidents. However, a single incident such as the breakup of the Torrey Canyon can have disastrous results. With increasing tanker traffic in already crowded harbors, the probability of such an incident is increased.

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Energy Imports

Natural Gas

Pipeline imports of natural gas into the U.S. have come mainly from Canada and Mexico. However, significant expansion of natural gas imports from these countries is questionable because of increasing domestic demand, both current and future, within Canada and Mexico. If new Canadian discoveries result in large reserve additions, major surpluses may become available for export to the U.S.

The growing shortage of domestic gas has encouraged projects to import liquefied natural gas (LNG) under long term contract. Large scale shipping of LNG is a relatively new industry and the U.S. does not yet have facilities for receiving base load shipments. Several LNG projects are now under consideration on the Pacific, Atlantic, and Gulf coasts. However, the Middle East oil cutback has raised questions concerning the security of foreign, especially Algerian, sources of LNG. The complexity of and length of time involved in implementing these proposals has been increased by the need for negotiating preliminary contracts, securing the approval of the Federal Power Commission and the exporting country, and making adequate provision for environmental and safety concerns in the proposed U.S. facilities.

Natural gas imports of 1.4 to 2.9 billion cubic feet a day (504 to 1044 billion cubic feet a year) would be required to replace the total energy expected from the sale. The chief source of possible increased pipeline natural gas imports is Canada. The Canadian policy has been to restrict the level of natural gas exports in order to build a large domestic reserve. Unless this policy changes or significant new Canadian discoveries are made, it is unlikely that more gas would be available to import.

LNG import levels will depend on how soon this industry can be introduced into the U.S. The question of security of foreign LNG supplies has caused re-evaluation of these projects. To supply the energy expected from the proposed sale with LNG imports would require unloading one 125,000 cubic meter tanker every day to every other day and the construction of four to eight 350 million cubic feet a day regasification plants.

The environmental impacts of LNG imports arise from tankers; terminal, transfer, and regasification facilities; and transportation of the gas. The primary hazard of handling LNG is the possibility of a fire or explosion during transportation, transfer, or storage.

Receiving and regasification facilities will require prime shoreline locations and dredging of channels. Regasification of LNG will release few pollutants to the air or water.

LMG imports will influence the U.S. balance of payments. This impact will depend on the origin and purchase price of the LNG, the source of the capital, and the country (U.S. or foreign) in which equipment is purchased and LNG tankers are built.

8. Other Energy Sources

The basic nature and occurrence of any energy source largely govern the technological opportunities and problems involved in its application. As research continues probing into the nature of numerous energy sources, many potential alternatives to conventional energy production are emerging. The existence of some of these sources has been known for decades, although unfavorable economics or incompletely developed technologies have hampered their commercial application. Long range projections must take into account such potential sources of energy, since a major technological breakthrough in any number of areas could realize a considerable change in the current energy picture.

Environmental impacts of these more exotic alternatives are difficult to assess, particularly where there is a great amount of research and development that must be done before operational scale systems can be developed, tested, and evaluated for production and application.

Lack of resources (due either to geographic location or lack of quantity and quality), underdeveloped technology, or lack of an economic advantage over conventional energy sources are the chief reasons these other sources are unlikely to have significant availability before 1985. Below are summarized the various energy forms considered here in relation to their primary and secondary limitations.

I. Possible significant energy contribution before 1985 1/

<u>Energy forms</u>	<u>Primary limitations</u>	<u>Secondary limitations</u>
Geothermal energy	Resources	Economics
Tar sands	Resources	Economics

II. Improbable significant contributions before 1985

<u>Energy forms</u>	<u>Primary limitations</u>	<u>Secondary limitations</u>
Hydrogen	Economics	Technology
Biological (agri-cultural & wastes)	Economics	Resources
Solar	Technology	Economics
Tidal	Resources	Economics
Wind	Resources	Economics

Energy Conversion Devices

Fuel cells	Technology	Economics
Thermionics	Technology	Economics
Thermoelectric	Technology	Economics
Magnetohydro-dynamics	Technology	Economics

1/ After: New Energy Forms Task Group 1971-1985, National Petroleum Council Committee on U.S. Energy Outlook, 1972.

Federal energy research and development funding has expanded significantly in the last few years. President Nixon announced in his Energy Message of January 23, 1974, that Federal commitment for direct energy research and development will be increased to \$1.8 billion in FY 75. The table below shows the funds for different areas of research and the agencies involved.

Federal Energy R&D Funding
(\$ million)

Direct programs	FY74	FY75	Agency*
<u>Conservation</u>	<u>65.0</u>	<u>128.6</u>	
a. End use (residential & commercial)	15.0	27.9	DOI, other
b. Improved efficiency (transmission)	5.0	18.8	AEC, DOI, NSF
c. Improved efficiency (conversion)	14.9	29.8	AEC, DOI, NSF
d. Improved efficiency (storage)	2.9	6.4	AEC, NSF
e. Automotive	14.2	23.7	AEC, EPA, NSF, DOT, DOD, NASA
f. Other transportation	13.0	22.0	DOT, DOC
<u>Oil, gas, and shale</u>	<u>19.1</u>	<u>41.8</u>	
a. Production	3.0	17.0	DOI
b. Resource assessment	5.0	13.1	DOI, NSF
c. Oil shale	2.3	3.0	DOI
d. Related programs	8.8	8.7	AEC, DOI
<u>Coal</u>	<u>164.4</u>	<u>415.5</u>	
a. Mining	7.5	55.0	DOI
b. Mining, health, & safety	27.0	27.7	DOI
c. Direct combustion	15.9	36.2	DOI, NSF
d. Liquefaction	45.5	108.5	DOI, NSF
e. Gasification (high BTU)**	33.0	65.3	DOI, NSF, AEC
f. Gasification (low BTU)	21.3	50.7	DOI, NSF
g. Synthetic fuels pioneer prog.		42.1	DOI
h. Resource assessment	1.2	1.9	DOI
i. Other (incl. common technology)	11.7	28.1	DOI

<u>Environmental control</u>	<u>65.5</u>	<u>178.5</u>	
a. Near term SO _x	39.9	82.0	EPA, DOI
b. Advanced SO _x	4.0	12.0	EPA
c. Other fossil fuel pollutants (incl. NO _x , particulates)	13.1	57.0	EPA
d. Thermal pollution	1.5	18.5	EPA, AEC
e. Automotive emissions	7.0	9.0	EPA
<u>Nuclear fission</u>	<u>530.5</u>	<u>724.7</u>	AEC
a. LMFBR	357.3	473.4	
b. Other breeders (GCFR & MSBR)	4.0	11.0	
c. HTGR	13.8	41.0	
d. LWBR	29.0	21.4	
e. Reactor safety research	48.6	61.2	
f. Waste management	6.2	11.5	
g. Uranium enrichment	57.5	66.0	
h. Resource assessment	3.4	10.4	
i. Other (incl. advanced tech.)	10.7	28.8	
<u>Nuclear fusion</u>	<u>101.1</u>	<u>168.6</u>	AEC
a. CTR	57.0	102.3	
b. Laser***	44.1	66.3	
<u>Other</u>	<u>53.5</u>	<u>157.5</u>	
a. Solar	13.8	50.0	AEC, NSF
b. Geothermal	10.9	44.7	AEC, DOI, NSF
c. Systems studies	17.3	30.0	AEC, DOI, NSF, FEO, Treasury, FPC, other
d. Misc.	11.5	32.8	NSF, DOI
<u>Support programs</u>			
<u>Environmental effects research</u>	<u>169.7</u>	<u>303.4</u>	AEC, EPA, NSF
a. Pollutant characterization, measurement, & monitoring	16.3	37.4	
b. Transport of pollutants	26.6	55.6	
c. Health effects	72.6	112.5	
d. Ecological effects	27.3	65.0	
e. Social & welfare effects	17.5	19.8	
f. Environmental assessment & policy formulation	9.4	13.1	

<u>Basic research</u>	<u>94.5</u>	<u>174.6</u>	AEC, NSF
a. Materials	13.2	32.9	
b. Chemical, physical, engineering	30.8	58.1	
c. Biological	40.3	60.5	
d. Plasmas	2.8	8.2	
e. Mathematical	7.4	14.9	
<u>Manpower development</u>	<u>6.3</u>	<u>8.5</u>	AEC, NSF
Total (direct energy R&D)	999.1	1,815.5	
Total (support programs)	270.5	486.5	
Total (direct & support)	1,269.6	2,302.0	

*Agency codes:

AEC - Atomic Energy Commission
 DOC - Department of Commerce
 DOD - Department of Defense
 DOI - Department of the Interior
 DOT - Department of Transportation
 EPA - Environmental Protection Agency
 FEO - Federal Energy Office
 FPC - Federal Power Commission
 NASA - National Aeronautics and Space Administration
 NSF - National Science Foundation

**Funds for high Btu gasification in the Office of Coal Research budget do not include Trust Fund amounts.

***Includes amounts for laser fusion directed toward military applications.

9. Combination of Alternatives

In the interest of clarity of presentation this analysis has discussed separately each potential alternative form of energy as a possible substitute to the oil and gas anticipated from the proposed sale. It is highly unlikely that there will ever be a single definitive choice to be made between any potential energy form and its alternatives. Each may have a role to play; some may make major contributions to our energy supplies, while others may be subordinated to lesser roles. Some alternatives may be developed rapidly; others may evolve more slowly, perhaps to make a more important contribution at a later date. Forecasting on the basis of present knowledge of the relative roles of these potential alternatives is a highly subjective exercise which must necessarily include a large measure of judgement as to future trends in such variables as the direction and pace of technological development, the identification of usable resources, the rate of national economic growth and changes in our life style.

It seems most probable that many alternatives will be developed to some degree. Understanding of the extent to which they may replace or complement offshore oil and gas requires reference to the characteristics of our total national energy system. Factors most relevant to the issues at hand are outlined below:

1. Historical relationships indicate that energy requirements will grow at approximately the same rate as gross national product.
2. Energy requirements can be constrained to some degree through the price mechanisms in a free market or by more direct constraints. One important type of direct constraint operating to reduce energy requirements is through the substitution of capital investment in lieu of energy; e.g., insulation to save fuel. Other potentials for lower energy use have more far-reaching impacts and may be long range in their implementation - they include rationing, altered transportation modes, and major changes in living conditions and life styles. Even severe constraints on energy use can be expected to only slow, not halt, the growth in energy requirements within the time frame of this statement.

3. Energy sources are not completely interchangeable.

Solid fuels cannot be used directly in internal combustion engines for example. Fuel conversion potentials are severely limited in the short term although somewhat greater flexibility exists in the longer run and generally involves choices in energy-consuming capital goods.

The principal competitive interface between fuels is in electric powerplants. Moreover, the full range of flexibility in energy use is limited by environmental considerations.

4. A broad spectrum of research and development is being directed to energy conversion - more efficient nuclear reactors, coal gasification and liquefaction, liquified natural gas (LNG), and shale retorting, among others. Several of these should assume important roles in supplying future energy requirements, though their future competitive relationship is not yet predictable.

5. Major potentials for filling the supply/demand imbalance for domestic resources are:
 - More efficient use of energy
 - Environmentally acceptable systems which will permit production and use of larger volumes of domestic coals.

- Accelerated exploration and development of all domestic oil and gas resources.
- Development of the Nation's oil shale resources.

Of the foregoing increased domestic oil and gas production offers considerable possibilities, although adequate incentives must exist for indicated and undiscovered domestic resources to be discovered and extracted.

6. The acceptability of oil and gas imports as an alternative is diminished by:

- The security risks inherent in placing reliance for essential energy supplies on sources which have demonstrated themselves to be politically unstable and prone to use interruption of petroleum supplies to exert economic and political pressure on their customers.
- The aggravation of unfavorable international trade and payments balances which would accompany substantial increases in oil and gas imports.
- Apparent high costs of liquefying and transporting natural gas other than overland by pipeline.

C. Delay Sale

1. Until New Technology is Available to Provide Increased Environmental Protection

The sale could be delayed until new technology is available: however, basically safe technology is available provided its application and use are properly regulated and controlled. As new technology relating to safety and environmental protection is developed, it can be incorporated with existing requirements and applied to all OCS leases so that bringing on additional production now will not generally preclude adaptation of new advances to the prospective leases. "Zero risk" does not exist but is an idea toward which safety systems are directed. In the history of Federal offshore leasing and production over the past 19 years only 11 spills of 1,000 bbl. or more have occurred in more than approximately 1,500 leases, 10,500 drilling holes, and 1,939 producing platforms.

2. Pending Completion of Studies Concerning the Potential Environmental Impacts of Offshore Minerals Development in General and Oil Spills Specifically

The proposed sale could be delayed pending completion of all studies concerning the potential environmental impacts of offshore minerals development in general and oil spills specifically. Many long-term, ongoing studies relating to these issues are being conducted by the scientific community, industry, and government. The Bureau of Land Management is initiating long-term, ongoing studies of its own both on an inhouse and contract basis. See Section I.G. for a description of the Bureau's present study efforts relating to the OCS program.

A central feature of many of these studies is that they are never really completed in the sense that they rarely reach definitive conclusions with wide applicability, but simply advance from one stage to another, from one level of analysis to another, thereby contributing to a growing area of knowledge and body of literature pertaining to the numerous complexities of environmental analysis. To delay the sale on the basis of incompleted studies would require an indefinite delay perhaps of many years duration. As the recent University of Oklahoma study:

"Energy Under the Oceans: A Technology Assessment of Outer Continental Shelf Oil and Gas Operations", points out, current and programmed research on OCS environmental data will help improve our knowledge, however, acquiring a total functional understanding of the coastal environmental is an "extremely long-term goal". Undoubtedly, information gaps and uncertainties will always be associated with offshore minerals development and any delays in such development programs must be judged on the basis of whether or not these gaps and uncertainties are so great, compared to what is known, as to warrant postponement. The OCS oil and gas leasing program will help make available increased supplies of energy resources of Federal lands for national energy needs. Final judgment must rest on a determination regarding whether or not a delay in this proposed lease sale would be in the Nation's best interest.

3. Pending Development of Land Use and Growth Plans Onshore

The proposed sale could be delayed pending the development of land use and growth plans onshore. Timetables for onshore development plans differ from state to state in terms of initial development of plans, updating, revisions, and subsequent implementation. Delay of the sale awaiting such plans could cause the development of the offshore mineral resources to occur in a piecemeal, unorderly manner. It could result in a greater degree of coordinated planning between states and the Federal Government especially with regard to coastal areas and would result in the avoidance of potential environmental impacts resulting from lack of coordinated efforts. It should be stated, however, that onshore development must take place within the authority of state and local agencies, and coordination with the jurisdictional agencies is sought throughout the entire leasing and development process.

4. Pending Completed Implementation of Recommendations Made in Reports on OCS Operating Orders and Regulations and a Review of Regulations and Amendment as Necessary

A decision could be made to delay this sale until the implementation of those recommendations made in reports concerning strengthening operating procedures discussed in Vol. I, Section I.G.2 had been completed. During the implementation of these recommendations, a review could be completed of all operating and leasing regulations, OCS orders, and statutory provisions to locate sections that needed revision. Any necessary amendments of the regulations and orders

could be made through the appropriate procedures and if sections of the OCS Act were found to need revision, amendments could be suggested to Congress. In considering this alternative, the existing authority of the OCS Act to prescribe and amend regulations at any time when the Secretary determines it to be necessary and proper so as to provide for the prevention of waste and conservation of the natural resources of the Outer Continental Shelf and the protection of correlative rights therein must be kept in mind. 43 U.S.C. § 1334(a)(1). Any revisions of the operating regulations or the OCS orders which relate to the prevention of waste, conservation of natural resources, or protection of correlative rights could be made at any time and apply to all existing leases. It is unlikely, however, that amendments to the OCS Act or regulations dealing with matters other than the above could be applied to leases in existence at the time of the amendment. If such amendments were felt necessary for leases which may be executed if the proposed sale takes place, they would have to be done before the leases were signed by the parties.

Environmental Impact of a Decision to Delay the Sale

A decision to delay the sale based upon any combination of the four reasons given above would eliminate any environmental impact to the offshore or onshore area of the sale during the period of the delay. The environment of the area would exist during the delay essentially as it does today. Assuming a decision was made to hold the sale at a future date after all the reasons for delay had been

satisfied, the environmental impact would reflect the degree of success achieved in attaining more fail-safe technology, baseline biological data against which the potential impacts could be assessed, land use development plans with which operations could be coordinated, and revised leasing and operating regulations and orders to strengthen the management of OCS operations and minimize the impact of such operations.

It is conceivable that the potential environmental impact of operations resulting from a sale held after such a delay would be of much the same character as those potential impacts discussed in this statement, but that the potential for such impacts occurring would be minimized.

Some impacts might be reduced entirely if changes in operating techniques were the result of the review conducted during the delay period. For instance, biological baseline data and other research might suggest that drilling muds are harmful when released into the marine environment. If such findings were made, different operating procedures would no doubt result to eliminate or reduce this impact. Such different operating procedures would have their own environmental impact which would have to be considered.

If this sale were delayed for the reasons given, it is evident that the delay would be for more than just a few months. A delay of at least two years could reasonably be expected to complete baseline studies, develop improved technology, implement land use programs - particularly under the Coastal Zone Management Act, and implement

the recommendations and regulatory changes discussed above. In the event of a delay of that duration, alternative energy sources would be expected to fill the gap left in the needed energy supply during that period. These alternative energy sources have their own environmental impact as discussed earlier in this section of the statement. Depending upon the alternative source or combination of sources drawn upon to meet the demand left unsatisfied by the delay of this sale, the environmental impact to the Nation could be more or less than that anticipated from this sale.

Other than these general statements concerning the environmental impact of delaying this sale, it is difficult to determine the precise impacts should the sale be held at some later date. The changes that might be made in a later sale are speculative at this stage because of uncertainty of the type of baseline data that would have to be gathered, improvements in technology, and revised regulations that could result. It can be said with certainty, however, that prior to deciding to hold a sale at a later date, the environmental impact would be thoroughly assessed.

D. Government Exploratory Drilling Before Leasing

Another alternative to the present leasing system is Government exploratory drilling before holding lease sales. At the present time there is no exploratory drilling on the OCS prior to leasing. The U.S. Geological Survey receives all engineering and geological data from companies who have drilled on leases issued on the OCS. These data and geophysical data purchased on the open market are used by the Geological Survey to develop OCS lease policies and evaluate tracts prior to leasing.

Oil and gas companies spend millions of dollars acquiring geological and geophysical data, and on data processing and interpretations to enable them to compete in lease sales. In 1971, U.S. exploration expenditures were \$2.4 billion, down from an historical peak of 3.4 billion in 1968. (This cost includes drilling and equipping exploratory wells, acquiring undeveloped acreage, lease rentals, geological and geophysical expenditures, test well contributions, land department costs including leasing and scouting, and other, including direct overhead.) ^{1/} The value of their information depends upon its exclusive and proprietary nature. Because of the high costs, companies generally combine in "group shoots" and share the expenses of seismic data acquisition or purchase data from geophysical service companies. A very few companies have their own equipment and do their own work

^{1/} "What It Costs to Find Hydrocarbons in the U.S.," World Oil (October 1973), p. 77.

under research and development departments. Geophysical service companies acquire data on specific areas on a speculative basis hoping to sell it to several companies. Therefore, although several companies and the Government may have the same data it is proprietary to the purchaser and cannot be revealed. Each purchaser believes his competitive edge in its use is his interpretation and application.

Government exploratory drilling would have several advantages. It could establish the existence, possible extent, and quality of oil and gas resources, and signal problems that may occur if development follows. The Government would be in a better position to take the initiative in selecting tracts to be included in a sale, evaluating resource potential, determining pre-sale estimated value, analyzing lease bids, and identifying environmental problems for the protection of sensitive areas through lease stipulations. At the present time, the oil and gas industry sometimes has more seismic data than the Government for some tracts and industry assists Government through the nomination process in the selection of specific tracts in a general area designated for leasing.

The availability of data from Government exploratory drilling would tend to eliminate the need for costly exploratory effort by industry and encourage companies to channel their efforts into the acquisition and development of producible leases. Availability of data from

exploratory drilling could encourage smaller companies to participate in leasing by greatly reducing capital outlays required to evaluate tracts and reducing the competitive advantage of a few companies which possess exclusive data. These tendencies would be counteracted to the extent that companies distrusted Government findings and continued to undertake independent exploration and data acquisition.

Also, large companies having the same data and more money could still outbid smaller companies. However, data from exploratory drilling would provide significantly better resource evaluation than any other method.

The cost to the Government of an adequate exploration program would be tremendous, whether the Government contracted out the work or purchased and operated the equipment itself, hired its own personnel, and did all of its own analysis. For example, consider drilling costs alone. To drill a typical offshore exploratory well cost about \$2.1 million dollars. Of this, about 65% represents operating costs and 22% mobilization and demobilization. ^{1/} Each company evaluates in depth only the most promising tracts and those in which it has a particular interest. In contrast, a Government exploration program would require a detailed evaluation including seismic work and coring and exploratory drilling, of extensive OCS areas, not of just a few tracts. Under present practice, the cost of seismic data collection is lowered by being "speculative data" for sale to many companies.

^{1/} "Finance and Economics of Offshore Operations," World Oil (July 1973) p. 86.

A Government exploratory drilling program would result in the Government assuming the risks and costs now borne by companies. Much of the resources devoted to data acquisition and interpretation by private industry would be freed for development and production. Such a Government program would be tantamount to finding the oil for industry and leasing the reservoirs to be developed and produced.

The interpretation of these data to evaluate resource potential involves not only expertise using the latest state of the art but also highly sophisticated equipment. Under the present system, this expertise is found throughout many companies, each of which devotes a great amount of time and money to the development of better interpretative methods. Each company has its own interpretations and special knowledge, resulting in a diversity of approach to data analysis and use. Any company, as well as the Government, can miss the mark in evaluating a particular tract, but each company believes its competitive edge is its superior interpretation and use of data. Under a system where only the Government did exploratory drilling, the discovery rate could decline. Reserves which the Government underevaluated or overlooked might be less likely to be discovered.

The impacts of Government exploration would be essentially the same as industry's explorations. Industry is required to adhere to stringent standards developed by the Government and is inspected by Government employees enforcing those standards. It would be

inappropriate to believe the Government would make standards significantly more stringent for its own operations than it has for industry operations.

X. CONSULTATION AND COORDINATION WITH OTHERS

A. Federal

In the preparation of this Draft Environmental Statement, data and comments were requested and received from the following agencies:

Geological Survey

Environmental Protection Agency

National Park Service

Department of Commerce

Bureau of Sports Fish and Wildlife

The following agencies will be formally solicited for review comments on the Proposed Sale and the Draft Environmental Statement:

Geological Survey

Department of Commerce

National Park Service

Department of Defense

Bureau of Outdoor Recreation

Atomic Energy Commission

Bureau of Sport Fisheries and Wildlife

Treasury Department

Bureau of Mines

Department of Transportation

Office of Economic Analysis

Federal Power Commission

Environmental Protection Agency

Federal Energy Office

B. State

In the preparation of this Draft Environmental Statement, advice and data were solicited from the following offices within the state of Louisiana. These same offices will be asked to respond to the Draft Environmental Statement when it is available to the public.

State of Louisiana

Office of State Planning

Wild Life and Fisheries Commission

Department of Conservation

Commission on Intergovernmental Relations

C. Public

A formal public hearing concerning this proposed sale has been tentatively scheduled to be held in New Orleans, Louisiana in early June, 1974. Actual date will be published in the Federal Register.

ATTACHMENT A

OCS OPERATING ORDERS NOS. 1 THROUGH 12
GULF OF MEXICO

Notice to Lessees and Operators Of Federal

Oil, Gas, And Sulphur Leases

In The Outer Continental Shelf

Gulf Of Mexico Area

OCS Order Nos. 1 through 12—Gulf of Mexico



UNITED STATES
DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY
CONSERVATION DIVISION
Branch Of Oil and Gas Operations
Gulf Of Mexico Area

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CONSERVATION DIVISION
BRANCH OF OIL AND GAS OPERATIONS
GULF OF MEXICO AREA

NOTICE TO LESSEES AND OPERATORS OF FEDERAL OIL AND GAS
LEASES IN THE OUTER CONTINENTAL SHELF, GULF OF MEXICO AREA

MARKING OF WELLS, PLATFORMS, AND FIXED STRUCTURES

This Order is established pursuant to the authority prescribed in 30 CFR 250.11 and in accordance with 30 CFR 250.37. Section 250.37 provides as follows:

Well designations. The lessee shall mark promptly each drilling platform or structure in a conspicuous place, showing his name or the name of the operator, the serial number of the lease, the identification of the wells, and shall take all necessary means and precautions to preserve these markings.

The operator shall comply with the following requirements. Any departures from the requirements specified in this Order must be approved pursuant to 30 CFR 250.12(b).

1. Identification of Platforms, Fixed Structures. Platforms and structures, other than individual wellhead structures and small structures, shall be identified at two diagonal corners of the platform or structure by a sign with letters and figures not less than 12 inches in height with the following information: The name of lease operator, the name of the area, the block number of the area in which the platform or structure is located, and the platform or structure designation. The information shall be abbreviated as in the following example:

"The Blank Oil Company operates 'C' platform in
Block 37 of South Timbalier Area."

The identifying sign on the platform would show:

"BOC - S.T. - 37 - C."

2. Identification of Single Well Structures and Small Structures. Single well and small structures may be identified with one sign only, with letters and figures not less than 3 inches in

height. The information shall be abbreviated as in the following example:

"The Blank Oil Company operates well No. 1 which is equipped with a protective structure, in Block 68 in the East Cameron Area."

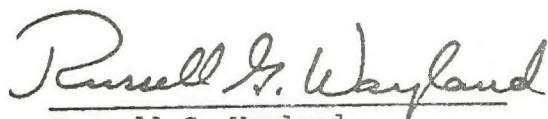
The identifying sign on the protective structure would show:

"BOC - E.C. - 68 - No. 1"

3. Identification of Wells. The OCS lease and well number shall be painted on, or a sign affixed to, each singly completed well. In multiple completed wells each completion shall be individually identified at the well head. All identifying signs shall be maintained in a legible condition.


Robert F. Evans
Supervisor

Approved: August 28, 1969


Russell G. Wayland
Chief, Conservation Division

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CONSERVATION DIVISION
BRANCH OF OIL AND GAS OPERATIONS
GULF OF MEXICO AREA

NOTICE TO LESSEES AND OPERATORS OF FEDERAL OIL AND GAS
LEASES IN THE OUTER CONTINENTAL SHELF, GULF OF MEXICO AREA

DRILLING PROCEDURES OFF LOUISIANA AND TEXAS

This Order is established pursuant to the authority prescribed in 30 CFR 250.11 and in accordance with 30 CFR 250.34, 250.41 and 250.91. All exploratory wells drilled for oil and gas shall be drilled in accordance with the provisions of this Order. Initial development wells drilled for oil and gas shall be drilled in accordance with the provisions of this Order which shall continue in effect until field rules are issued. After field rules have been established by the supervisor, development wells shall be drilled in accordance with such rules; except that in fields containing more than five development wells, additional development wells commenced prior to October 1, 1969, may be excluded from provisions of this Order, as approved by the supervisor, to permit time for the establishment of field rules.

Where sufficient geologic and engineering information is obtained through exploratory drilling, operators may make application to the supervisor for the establishment of field rules, but the operator(s) shall make such application before more than five development wells have been drilled in the field. Operators may also make application for the establishment of field rules for existing fields containing more than five development wells on the date of this Order. Each Application to Drill (Form 9-331C) for exploratory wells and development wells not covered by field rules shall include all information required under 30 CFR 250.91 and the integrated casing, cementing, mud, and blowout prevention program for the well, and shall comply with the following requirements. Any departures from the requirements specified in this Order must be approved pursuant to 30 CFR 250.12(b).

1. Well Casing and Cementing. All wells shall be cased and cemented in accordance with the requirements of 30 CFR 250.41(a)(1). The Application to Drill (Form 9-331C) shall contain a statement that all zones which contain oil, gas, or fresh water shall be fully protected by casing and cement. For the purpose of this Order, the several casing strings in order of normal installation are drive or structural casing, conductor casing, surface casing, intermediate casing, and production casing. All depths refer to true vertical depth (TVD).

- A. Drive or Structural Casing. This casing shall be set by drilling, driving, or jetting to a minimum depth of 100 feet below the Gulf floor or to such greater depth required to support unconsolidated deposits and to provide hole stability for initial drilling operations. If drilled in, the drilling fluid shall be a type that will not pollute the Gulf, and a quantity of cement sufficient to fill the annular space back to the Gulf floor must be used.
- B. Conductor and Surface Casing - General Principles. Determination of proper casing setting depths shall be based upon all geologic factors including the presence or absence of hydrocarbons and water depths on a well-for-well basis. The setting depths of all casing strings shall be determined by taking into account formation fracture gradients and hydrostatic pressure to be contained within the well bore. The conductor and surface casing shall be new pipe or reconditioned pipe that has been tested and inspected to verify a new condition.
- (1) Conductor Casing. This casing shall be set in accordance with the table below. A quantity of cement sufficient to fill the annular space back to the Gulf floor must be used. The cement may be washed out or displaced to a depth of 40 feet below the Gulf floor to facilitate casing removal upon well abandonment.
 - (2) Surface Casing. This casing shall be set at a depth in accordance with the table below and cemented in a manner necessary to protect all fresh water sands and provide well control until the next string of casing is set. This casing shall be cemented with a quantity sufficient to fill the calculated annular space to (a) at least 1,500 feet above the casing shoe, or (b) within 200 feet below the conductor casing. Whenever there are any indications of improper cementing, such as lost returns, cement channeling, or mechanical failure of equipment, a temperature or cement bond survey shall be run, either before or after remedial cementing, to aid in determining whether the casing is properly cemented. If the annular space is not adequately cemented by the primary operation, the operator shall either recement or squeeze cement the shoe after drilling out.
 - (3) Conductor and Surface Casing Setting Depths. These strings of casing shall be set at the depths specified in the following table subject to minor variation to permit the

casing to be set in a competent bed; provided, however, that the conductor casing shall be set before drilling into shallow formations known to contain oil or gas or, if unknown, upon encountering such formations. These casing strings shall be run and cemented prior to drilling below the specified setting depths. For those wells which may encounter abnormal pressure conditions, the district engineer may prescribe the exact setting depth within the ranges specified below.

Required Setting Depth Below Gulf Floor (TVD in feet)

Proposed Total Depth of Well or Depth of First Full String of Intermediate Casing (TVD in feet from Rorary Table)

	Surface Casing		Conductor Casing	
	Minimum	Maximum	Minimum	Maximum
0 - 7,000	1,500	2,500	300	800
7,000 - 9,000	1,750	3,000	400	800
9,000 -11,000	2,250	3,500	500	900
11,000 -13,000	3,000	4,000	600	900
13,000 -Below	3,500	4,500	700	1,000

C. Intermediate Casing. This string of casing shall be set when required by anticipated abnormal pressure, mud weights, sediment and other well conditions. The intermediate casing shall be new pipe or reconditioned pipe that has been tested and inspected to verify a new condition. A quantity of cement sufficient to cover and isolate all hydrocarbon zones and to isolate abnormal pressure intervals from normal pressure intervals shall be used. If a liner is used as an intermediate string, the cement shall be tested by a fluid entry or pressure test to determine whether a seal between the liner top and next larger string has been achieved. The test shall be recorded on the driller's log. When such liner is used as production casing, it shall be extended to the surface and cemented to avoid surface casing being used as production casing.

D. Production Casing. This string of casing shall be set before completing the well for production. The production casing shall be new pipe or reconditioned pipe that has been tested and inspected to verify a new condition. It shall be cemented in a manner necessary to cover or isolate all zones which contain hydrocarbons, but in any case, a calculated volume sufficient to fill the annular space at least 500 feet above the uppermost producible hydrocarbon zone must be used. When a liner is used as production casing, the testing of the seal between the liner top and next larger string shall be conducted as in the case of intermediate liners.

- E. Pressure Testing. Prior to drilling the plug after cementing, all casing strings, except the drive or structural casing, shall be pressure tested as shown in the table below. This test shall not exceed the working pressure of the casing. The surface casing shall be tested with water in the top 100 feet of the casing. If the pressure declines more than 10% in 30 minutes, or if there is other indication of a leak, the casing shall be recemented, repaired, or an additional casing string run, and the casing shall be tested again in the same manner.

<u>Casing String</u>	<u>Minimum Pressure Test (psi)</u>
Conductor	200
Surface	1,000
Intermediate	1,500 or 0.2 psi/ft., whichever is greater
Liner	1,500 or 0.2 psi/ft., whichever is greater
Production	1,500 or 0.2 psi/ft., whichever is greater

After cementing any of the above strings, drilling shall not be commenced until a time lapse of:

(1) 24 hours, or

(2) 8 hours under pressure for conductor casing string.
12 hours under pressure for all other strings.
(Cement is considered under pressure if one or more float valves are employed and are shown to be holding the cement in place or when other means of holding pressure is used.)

All casing pressure tests shall be recorded on the driller's log.

2. Blowout Prevention Equipment. Blowout preventers and related well control equipment shall be installed, used, and tested in a manner necessary to prevent blowouts. Prior to drilling below the conductor casing, blowout prevention equipment shall be installed and maintained ready for use until drilling operations are completed, as follows:

A. Conductor Casing. Before drilling below this string, at least one remotely controlled bag-type blowout preventer and equipment for circulating the drilling fluid to the drilling structure or vessel shall be installed. To avoid formation fracturing from complete shut-in of the well, a large diameter pipe with control valves shall be installed on the conductor casing below the blowout preventer so as to permit the diversion of hydrocarbons and

other fluids; except that when the blowout preventer assembly is on the Gulf floor, the choke and kill lines shall be equipped to permit the diversion of hydrocarbons and other fluids.

- B. Surface Casing. Before drilling below this string the blowout prevention equipment shall include a minimum of: (1) three remotely controlled, hydraulically operated, blowout preventers with a working pressure which exceeds the maximum anticipated surface pressure, including one equipped with pipe rams, one with blind rams, and one bag-type; (2) a drilling spool with side outlets, if side outlets are not provided in the blowout preventer body; (3) a choke manifold; (4) a kill line; and (5) a fill-up line.
- C. Intermediate Casing. Before drilling below this string the blowout prevention equipment shall include a minimum of: (1) four remotely controlled, hydraulically operated, blowout preventers with a working pressure which exceeds the maximum anticipated surface pressure, including at least one equipped with pipe rams, one with blind rams, and one bag-type; (2) a drilling spool with side outlets, if side outlets are not provided in the blowout preventer body; (3) a choke manifold; (4) a kill line; and (5) a fill-up line.
- D. Testing. Ram-type blowout preventers and related control equipment shall be tested with water to the rated working pressure of the stack assembly or to the working pressure of the casing, whichever is the lesser, (1) when installed; (2) before drilling out after each string of casing is set; (3) not less than once each week while drilling; and (4) following repairs that require disconnecting a pressure seal in the assembly. The bag-type blowout preventer shall be tested to 70 percent of the above pressure requirements.

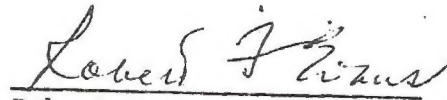
While drill pipe is in use ram-type blowout preventers shall be actuated to test proper functioning once each trip, but in no event less than once each day. The bag-type blowout preventer shall be actuated on the drill pipe once each week. Accumulators or accumulators and pumps shall maintain a pressure capacity reserve at all times to provide for repeated operation of hydraulic preventers. A blowout prevention drill shall be conducted weekly for each drilling crew to insure that all

equipment is operational and that crews are properly trained to carry out emergency duties. All blowout preventer tests and crew drills shall be recorded on the driller's log.

- E. Other Equipment. An inside blowout preventer assembly (back pressure valve) and drill string safety valve in the open position shall be maintained on the rig floor at all times while drilling operations are being conducted. Separate valves shall be maintained on the rig floor to fit all pipe in the drill string. A Kelly cock shall be installed below the swivel, and an essentially full opening Kelly cock shall be installed at the bottom of the Kelly of such design that it can be run through the blowout preventers.
3. Mud Program - General. The characteristics, use, and testing of drilling mud and the conduct of related drilling procedures shall be such as are necessary to prevent the blowout of any well. Quantities of mud materials sufficient to insure well control shall be maintained readily accessible for use at all times.
- A. Mud Control. Before starting out of hole with drill pipe, the mud shall be circulated with the drill pipe just off bottom until the mud is properly conditioned. When coming out of the hole with drill pipe, the annulus shall be filled with mud before the mud level drops below 100 feet, and a mechanical device for measuring the amount of mud required to fill the hole shall be utilized. The volume of mud required to fill the hole shall be watched, and any time there is an indication of swabbing, or influx of formation fluids, the necessary safety device(s) required in subparagraph 2(E) above shall be installed on the drill pipe, the drill pipe shall be run to bottom, and the mud properly conditioned. The mud shall not be circulated and conditioned except on or near bottom, unless well conditions prevent running the pipe to bottom. The mud in the hole shall be circulated or reverse circulated prior to pulling drill stem test tools from the hole.
- B. Mud Testing Equipment. Mud testing equipment shall be maintained on the drilling platform at all times, and mud tests shall be performed daily, or more frequently as conditions warrant.

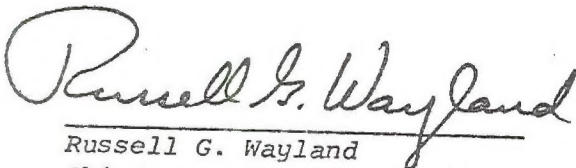
The following mud system monitoring equipment must be installed (with derrick floor indicators) and used throughout the period of drilling after setting and cementing the conductor casing:

- (1) Recording mud pit level indicator to determine mud pit volume gains and losses. This indicator shall include a visual or audio warning device.
- (2) Mud volume measuring device for accurately determining mud volumes required to fill the hole on trips.
- (3) Mud return indicator to determine that returns essentially equal the pump discharge rate.



Robert F. Evans
Supervisor

Approved: August 28, 1969



Russell G. Wayland
Chief, Conservation Division

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CONSERVATION DIVISION
BRANCH OF OIL AND GAS OPERATIONS
GULF OF MEXICO AREA

NOTICE TO LESSEES AND OPERATORS OF FEDERAL OIL AND GAS
LEASES IN THE OUTER CONTINENTAL SHELF, GULF OF MEXICO AREA

PLUGGING AND ABANDONMENT OF WELLS

This Order is established pursuant to the authority prescribed in 30 CFR 250.11 and in accordance with 30 CFR 250.15. The operator shall comply with the following minimum plugging and abandonment procedures which have general application to all wells drilled for oil and gas. Plugging and abandonment operations must not be commenced prior to obtaining approval from an authorized representative of the Geological Survey. Oral approvals shall be in accordance with 30 CFR 250.13. Any departures from the requirements specified in this Order must be approved pursuant to 30 CFR 250.12(b).

1. Permanent Abandonment.

- A. Isolation in Uncased Hole. In uncased portions of wells, cement plugs shall be spaced to extend 100 feet below the bottom to 100 feet above the top of any oil, gas, and fresh water zones so as to isolate them in the strata in which they are found and to prevent them from escaping into other strata.
- B. Isolation of Open Hole. Where there is open hole (uncased and open into the casing string above) below the casing, a cement plug shall be placed in the deepest casing string by (1) or (2) below, or in the event lost circulation conditions exist or are anticipated, the plug may be placed in accordance with (3) below:
- (1) A cement plug placed by displacement method so as to extend a minimum of 100 feet above and 100 feet below the casing shoe.
 - (2) A cement retainer with effective back pressure control set not less than 50 feet, nor more than 100 feet, above the casing shoe with a cement plug calculated to extend at least 100 feet below the casing shoe and 50 feet above the retainer.
 - (3) A permanent type bridge plug set within 150 feet above the casing shoe with 50 feet of cement on top of the bridge plug. This plug shall be tested prior to placing subsequent plugs.

- C. Plugging or Isolating Perforated Intervals. A cement plug shall be placed opposite all open perforations (perforations not squeezed with cement) extending a minimum of 100 feet above and 100 feet below the perforated interval or down to a casing plug whichever is less. In lieu of the cement plug, a bridge plug set at a maximum of 150 feet above the open perforations with 50 feet of cement on top may be used provided the perforations are isolated from the hole below.
- D. Plugging of Casing Stubs. If casing is cut and recovered, a cement plug 200 feet in length shall be placed to extend 100 feet above and 100 feet below the stub. A retainer may be used in setting the required plug.
- E. Plugging of Annular Space. No annular space that extends to the Gulf floor shall be left open to drilled hole below. If this condition exists, the annulus shall be plugged with cement.
- F. Surface Plug Requirement. A cement plug of a least 150 feet, with the top of the plug 150 feet or less below the Gulf floor, shall be placed in the smallest string of casing which extends to the surface.
- G. Testing of Plugs. The setting and location of the first plug below the top 150-foot plug, will be verified by either (1) placing a minimum pipe weight of 15,000 pounds on the plug, or (2) testing with a minimum pump pressure of 1,000 psig with no more than a 10 percent pressure drop during a 15-minute period.
- H. Mud. Each of the respective intervals of the hole between the various plugs shall be filled with mud fluid of sufficient density to exert hydrostatic pressure exceeding the greatest formation pressure encountered while drilling such interval.
- I. Clearance of Location. All casing and piling shall be severed and removed to at least 15 feet below the Gulf floor and the location shall be dragged to clear the well site of any obstructions.

2. Temporary Abandonment. Any drilling well which is to be temporarily abandoned shall be mudded and cemented as required for permanent abandonment except for requirements F and I of paragraph 1 above. When casing extends above the Gulf floor, a mechanical bridge plug (retrievable or permanent) shall be set in the casing between 15 and 200 feet below the Gulf floor.

Robert F. Evans
Robert F. Evans
Supervisor

Approved: August 28, 1969

Russell G. Wayland
Russell G. Wayland
Chief, Conservation Division

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CONSERVATION DIVISION
BRANCH OF OIL AND GAS OPERATIONS
GULF OF MEXICO AREA

NOTICE TO LESSEES AND OPERATORS OF FEDERAL OIL AND GAS
LEASES IN THE OUTER CONTINENTAL SHELF, GULF OF MEXICO AREA

SUSPENSIONS AND DETERMINATION OF WELL PRODUCIBILITY

This Order is established pursuant to the authority prescribed in 30 CFR 250.11 and in accordance with 30 CFR 250.12(d)(1). An OCS lease provides for extension beyond its primary term for as long as oil or gas may be produced from the lease in paying quantities. An OCS lease may be maintained beyond the primary term, in the absence of actual production, when a suspension of operations or production, or both, has been approved. An application for suspension of production for an initial period should be submitted prior to the expiration of the term of a lease. The supervisor may approve a suspension of production provided at least one well has been drilled on the lease and determined to be capable of being produced in paying quantities. The temporary or permanent abandonment of a well will not preclude approval of a suspension of production as provided in 30 CFR 250.12(d)(1). Any departures from the requirements specified in this Order must be approved pursuant to 30 CFR 250.12(b).

A well may be determined to be capable of producing in paying quantities when the requirements of either 1 or 2 below have been met.

1. Production Tests.

- A. Oil Wells. A production test of at least two hours duration, following stabilization, is required.
- B. Gas Wells. A deliverability test of at least two hours duration, following stabilization, or a four-point back-pressure test, is required.
- C. Witnessing and Results. All tests must be witnessed by an authorized representative of the Geological Survey. Test data accompanied by operator's affidavit, or third-party test data, may be accepted in lieu of a witnessed test provided prior approval is obtained from the appropriate district office. The results of the witnessed or accepted test must justify a determination that the well is capable of producing in paying quantities.

2. Production Capability. Information for determining producibility should be submitted in time to permit one week for evaluation and determination. In cases of urgency, determinations may be conveyed orally. The following may be considered as acceptable evidence that a well is capable of producing in paying quantities:

A. An induction-electric log of the well, clearly showing a minimum of 15 feet of producible sand in one section which does not include any interval which appears to be water saturated. All of the section counted as producible must exhibit the following properties:

(1) Electrical spontaneous potential exceeding 20 negative millivolts beyond the shale base line. If mud conditions prevent a 20 negative millivolt reading beyond the shale base line, a gamma ray log deflection of at least 70 percent of the maximum gamma ray deflection in the nearest clean water bearing sand may be substituted.

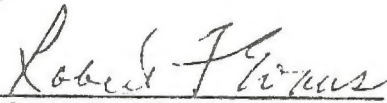
(2) A minimum true resistivity ratio of the producible section to the nearest clean water sand of at least 5:1, provided the producible section exhibits a minimum resistivity of 2.0 ohm-meters.

(3) A porosity log indicating porosity in the producible section.

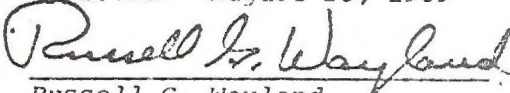
B. Sidewall cores and core analysis which indicates that the section is producible.

C. A wire line formation test or evidence that an attempt was made to obtain such test. The test results must indicate that the section is producible.

D. All logs run must support other evidence that the section is producible.


Robert F. Evans
Supervisor

Approved: August 28, 1969


Russell G. Wayland
Chief, Conservation Division

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CONSERVATION DIVISION
BRANCH OF OIL AND GAS OPERATIONS
GULF OF MEXICO AREA

NOTICE TO LESSEES AND OPERATORS OF FEDERAL OIL AND GAS
LEASES IN THE OUTER CONTINENTAL SHELF, GULF OF MEXICO AREA

INSTALLATION OF SUBSURFACE SAFETY DEVICE

This Order is established pursuant to the authority prescribed in 30 CFR 250.11 and in accordance with 30 CFR 250.41(b). Section 250.41(b) provides as follows:

- (b) Completed Wells. In the conduct of all its operations, the lessee shall take all steps necessary to prevent blowouts, and the lessee shall immediately take whatever action is required to bring under control any well over which control has been lost. The lessee shall: (1) in wells capable of flowing oil or gas, when required by the supervisor, install and maintain in operating condition storm chokes or similar subsurface safety devices; (2) for producing wells not capable of flowing oil or gas, install and maintain surface safety valves with automatic shutdown controls; and (3) periodically test, or inspect such devices or equipment as prescribed by the supervisor.

The operator shall comply with the following requirements. All departures from the requirements specified in this Order shall be subject to approval pursuant to 30 CFR 250.12(b). All applications for approval under the provisions of this Order shall be submitted to the appropriate District office. References in this Order to approvals, determinations, or requirements are to those given or made by the Supervisor or his delegated representative.

1. Installation. All new and existing tubing installations open to hydrocarbon-bearing zones shall be equipped with a subsurface-controlled or a surface- or other remotely controlled subsurface safety device, to be installed at a depth of 100 feet or more below the sea floor unless, after application and justification, the well is determined to be incapable of flowing oil or gas. These installations shall be made as required in subparagraphs A and B below within two (2) days after stabilized production is established, and during this period of time the well shall not be left unattended while open to production.

A. New Wells. All tubing installations in wells completed after December 1, 1972, shall be equipped with a surface- or other remotely controlled subsurface safety device; provided, that wells with a shut-in tubing pressure of 4,000 psig or greater shall be equipped with a subsurface-controlled subsurface safety device in lieu of a surface- or other remotely controlled subsurface safety device unless a surface- or other remotely controlled subsurface safety device is approved or required. When the shut-in tubing pressure declines below 4,000 psig, a surface- or other remotely controlled subsurface safety device shall be installed when the tubing is first removed and reinstalled.

B. Existing Wells. All tubing installations in wells existing on the date of this Order shall be equipped with a surface- or other remotely controlled subsurface safety device when the tubing is first removed and reinstalled after December 1, 1972; provided, that wells with a shut-in tubing pressure of 4,000 psig or greater shall be equipped with a subsurface-controlled subsurface safety device in lieu of a surface- or other remotely controlled subsurface safety device unless a surface- or other remotely controlled subsurface safety device is approved or required. When the shut-in tubing pressure declines below 4,000 psig, a surface- or other remotely controlled subsurface safety device shall be installed when the tubing is first removed and reinstalled.

Tubing installations in existing wells completed from single-well and multi-well satellite caissons or jackets and sea-floor completions may be equipped with a subsurface-controlled subsurface safety device, in lieu of a surface- or other remotely controlled subsurface safety device, upon application, justification, and approval.

C. Shut-in Wells. A tubing plug shall be installed in lieu of, or in addition to, other subsurface safety devices if a well has been shut in for a period of six (6) months. Such plugs shall be set at a depth of 100 feet or more below the sea floor. All retrievable plugs installed after the date of this Order shall be of the pump-through type. All wells perforated and completed, but not placed on production, shall be equipped with a subsurface safety device or tubing plug within two (2) days after completion.

D. Injection Wells. Subsurface safety devices as required in subparagraphs A and B above shall be installed in all injection wells unless, after application and justification, it is determined that the well is incapable of flowing oil or gas, which condition shall be verified annually.

2. Technological Advancement. As technological research, progress, and product improvement result in increased effectiveness of existing safety devices or the development of new devices or systems, such devices or systems may be required or used upon application, justification, and approval. Applications for routine use shall include evidence that the device or system has been field-tested at least once each month for a minimum of six (6) consecutive months, and that each test indicated proper operation.

3. Testing and Inspection. Subsurface safety devices shall be designed, adjusted, installed, and maintained to insure reliable operation. During testing and inspection procedures, the well shall not be left unattended while open to production unless a properly operating subsurface safety device has been installed in the well.

A. Surface-Controlled Subsurface Safety Devices. Each surface- or other remotely controlled subsurface safety device installed in a well shall be tested in place for proper operation when installed and thereafter at intervals not exceeding six (6) months. If the device does not operate properly, it shall be removed, repaired, and reinstalled or replaced and tested to insure proper operation.

B. Subsurface-Controlled Subsurface Safety Devices. Each subsurface-controlled subsurface safety device installed in a well shall be removed, inspected, and repaired or adjusted as necessary and reinstalled at intervals not exceeding six (6) months; provided, that such removable devices set in a landing nipple shall be removed, inspected, and repaired or adjusted as necessary and reinstalled at intervals not exceeding twelve (12) months. Each velocity-type device shall be designed to close at a flow rate not to exceed the larger of either 150 percent of, or 200 BFPD above, the most recent well-test rate which equals or exceeds the approved production rate. The above closing flow rate shall not exceed the calculated capacity of the well to produce against a flowing wellhead pressure of 50 psig. Each preset tubing-pressure-actuated device shall be designed to close prior to reduction of the flowing wellhead pressure to 50 psig.

C. Tubing Plugs. A shut-in well equipped with a tubing plug shall be inspected for leakage by opening the well to possible flow at intervals not exceeding six (6) months. If sustained liquid flow exceeds 400 cc/min., or gas flow exceeds 15 cu. ft./min., the plug shall be removed, repaired, and reinstalled or an additional tubing plug installed to prevent leakage.

4. Temporary Removal. Each wireline- or pumpdown-retrievable subsurface safety device may be removed, without further authority or notice, for a routine operation which does not require approval of a Sundry Notice and Report on Wells (Form 9-331) for a period not to exceed fifteen (15) days. The well shall be clearly identified as being without a subsurface safety device and shall not be left unattended while open to production. The provisions of this paragraph are not applicable to the testing and inspection procedures in paragraph 3 above.
5. Additional Protective Equipment. All tubing installations made after the date of this Order in which a wireline- or pumpdown-retrievable subsurface safety device is to be installed shall be equipped with a landing nipple, with flow couplings or other protective equipment above and below, to provide for setting of the subsurface safety device. All wells in which a subsurface safety device or tubing plug is installed shall have the tubing-casing annulus packed off above the uppermost open casing perforations. The control system for all surface-controlled subsurface safety devices shall be an integral part of the platform shut-in system, or of an independent remote shut-in system.
6. Departures. All departures (or waivers) approved prior to the date of this Order are hereby terminated as of December 1, 1972, unless new applications are submitted prior to that date. All such new applications will be considered for approval pursuant to 30 CFR 250.12(b) and the requirements of this Order. All applications for departures shall include a detailed statement of the well conditions, efforts made to overcome any difficulties, and proposed alternate safety measures.
7. Emergency Action. All tubing installations open to hydrocarbon-bearing zones and not equipped with a subsurface safety device as permitted by this Order shall be clearly identified as not being so equipped, and a subsurface safety device or tubing plug shall be available at the field location. In the event of an emergency, such as an impending hurricane, such device or plug shall be promptly installed within the limits of practicability, due consideration being given to personnel safety.
8. Records. The operator shall maintain the following records for a minimum period of one year for each subsurface safety device and tubing plug installed, which records shall be available to any authorized representative of the Geological Survey.
 - A. Field Records. Individual well records shall be maintained at or near the field and shall include, as a minimum, the following information:

- (1) A record which will give design and other information; i.e., make, model, type, spacers, bean and spring size, pressure, etc.
- (2) Verification of assembly by a qualified person in charge of installing the device and installation date.
- (3) Verification of setting depth and all operational tests as required in this Order.
- (4) Removal date, reason for removal, and reinstallation date.
- (5) A record of all modifications of design in the field.
- (6) All mechanical failures or malfunctions, including sand-cutting, of such devices, with notation as to cause or probable cause.
- (7) Verification that a failure report was submitted.

B. Other Records. The following records, as a minimum, shall be maintained at the operator's office:

- (1) Verified design information of subsurface-controlled subsurface safety devices for the individual well.
- (2) Verification of assembly and installation according to design information.
- (3) All failure reports.
- (4) All laboratory analysis reports of failed or damaged parts.
- (5) Quarterly failure-analysis report.

9. Reports. Well completion reports (Form 9-330) and any subsequent reports of workover (Form 9-331) shall include the type and the depth of the subsurface safety devices and tubing plugs installed in the well or indicate that a departure has been granted.

To establish a failure-reporting and corrective-action program as a basis for reliability and quality control, each operator shall submit a quarterly failure-analysis report to the office of the Supervisor, identifying mechanical failures by lease and well, make and model, cause or probable cause of failure, and action taken to correct the failure. The reporting period shall begin the first day of the month following the date of this

Order. The reports shall be submitted by February 28, May 31, August 31, and November 30 for the periods ending January 31, April 30, July 31, and October 31 of each year.

Robert F. Evans
Robert F. Evans
Supervisor

Approved: June 5, 1972

Russell G. Wayland
Russell G. Wayland
Chief, Conservation Division

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CONSERVATION DIVISION
BRANCH OF OIL AND GAS OPERATIONS
GULF OF MEXICO AREA

NOTICE TO LESSEES AND OPERATORS OF FEDERAL OIL AND GAS
LEASES IN THE OUTER CONTINENTAL SHELF, GULF OF MEXICO AREA

PROCEDURE FOR COMPLETION OF OIL AND GAS WELLS

This Order is established pursuant to the authority prescribed in 30 CFR 250.11 and in accordance with 30 CFR 250.92. Any departures from the requirements specified in this Order must be approved pursuant to 30 CFR 250.12(b).

1. Wellhead Equipment and Testing Procedures.

A. Wellhead Equipment. All completed wells shall be equipped with casingheads, wellhead fittings, valves and connections with a rated working pressure equal to or greater than the surface shut-in pressure of the well. Connections and valves shall be designed and installed to permit fluid to be pumped between any two strings of casing. Two master valves shall be installed on the tubing in wells with a surface pressure in excess of five thousand pounds per square inch. All wellhead connections shall be assembled and tested, prior to installation, by a fluid pressure which shall be equal to the rated test pressure of the fitting to be installed.

B. Testing Procedure. Any wells showing sustained pressure on the casinghead, or leaking gas or oil between the production casing and the next larger casing string, shall be tested in the following manner: The well shall be killed with water or mud and pump pressure applied. Should the pressure at the casinghead reflect the applied pressure, the casing shall be condemned. After corrective measures have been taken, the casing shall be tested in the same manner. This testing procedure shall be used when the origin of the pressure cannot be determined otherwise.

2. Storm Choke. All completed wells shall meet the requirements prescribed in OCS Order No. 5.

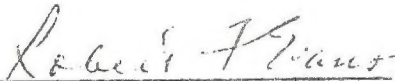
3. Procedures for Multiple or Tubingless Completions.

A. Multiple Completions.

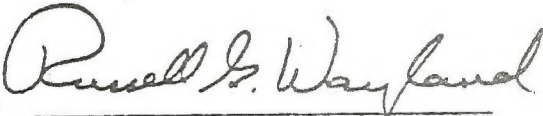
- (1) Information shall be submitted on, or attached to, Form 9-331 showing top and bottom of all zones proposed for completion or alternate completion, including a partial electric log and a diagrammatic sketch showing such zones and equipment to be used.
- (2) When zones approved for multiple completion become intercommunicated the lessee shall immediately repair and separate the zones after approval is obtained.

B. Tubingless Completions.

- (1) All tubing strings in a multiple completed well shall be run to the same depth below the deepest producible zone.
- (2) The tubing string(s) shall be new pipe and cemented with a sufficient volume to extend a minimum of 500 feet above the uppermost producible zone.
- (3) A temperature or cement bond log shall be run in all tubingless completion wells where lost circulation or other unusual circumstances occur during the cementing operations.
- (4) Information shall be submitted on, or attached to, Form 9-331 showing the top and bottom of all zones proposed for completion or alternate completion, including a partial electric log and a diagrammatic sketch showing such zones and equipment to be used.


Robert F. Evans
Supervisor

Approved: August 28, 1969


Russell G. Wayland
Chief, Conservation Division

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CONSERVATION DIVISION
BRANCH OF OIL AND GAS OPERATIONS
GULF OF MEXICO AREA

NOTICE TO LESSEES AND OPERATORS OF FEDERAL LEASES
IN THE OUTER CONTINENTAL SHELF, GULF OF MEXICO AREA

POLLUTION AND WASTE DISPOSAL

This Order is established pursuant to the authority prescribed in 30 CFR 250.11 and in accordance with 30 CFR 250.43. Section 250.43 provides as follows:

- (a) The lessee shall not pollute land or water or damage the aquatic life of the sea or allow extraneous matter to enter and damage any mineral- or water-bearing formation. The lessee shall dispose of all liquid and non-liquid waste materials as prescribed by the supervisor. All spills or leakage of oil or waste materials shall be recorded by the lessee and, upon request of the supervisor, shall be reported to him. All spills or leakage of a substantial size or quantity, as defined by the supervisor, and those of any size or quantity which cannot be immediately controlled also shall be reported by the lessee without delay to the supervisor and to the Coast Guard and the Regional Director of the Federal Water Pollution Control Administration. All spills or leakage of oil or waste materials of a size or quantity specified by the designee under the pollution contingency plan shall also be reported by the lessee without delay to such designee.
- (b) If the waters of the sea are polluted by the drilling or production operations conducted by or on behalf of the lessee, and such pollution damages or threatens to damage aquatic life, wildlife, or public or private property, the control and total removal of the pollutant, wherever found, proximately resulting therefrom shall be at the expense of the lessee. Upon failure of the lessee to control and remove the pollutant the supervisor, in cooperation with other appropriate agencies of the Federal, State and local governments, or in cooperation with the lessee, or both, shall have the right to accomplish the control and removal of the pollutant in accordance with any established contingency plan for combating oil spills or by other means at the cost of the lessee. Such action shall not relieve the lessee of any responsibility as provided herein.

- (c) The lessee's liability to third parties, other than for cleaning up the pollutant in accordance with subsection (b) above, shall be governed by applicable law.

The operator shall comply with the following requirements. Any departures from the requirements specified in this Order must be approved pursuant to 30 CFR 250.12(b).

1. Pollution Prevention. In the conduct of all oil, gas and sulphur operations, the operator shall prevent pollution of the waters of the Gulf of Mexico. The operator shall comply with the following pollution prevention requirements:

A. Liquid Disposal.

- (1) Oil in any form shall not be disposed of into the waters of the Gulf.
- (2) Liquid waste materials containing substances which may be harmful to aquatic life or wildlife, or injurious in any manner to life or property, shall be treated to avoid disposal of harmful substances into the waters of the Gulf.
- (3) Drilling mud containing oil shall not be disposed of into the Gulf. Drilling mud containing toxic substances shall be neutralized prior to disposal.

B. Solid Waste Disposal.

- (1) Drill cuttings, sand, and other solids containing oil shall not be disposed of into the Gulf unless the oil has been removed.
- (2) Mud containers and other solid waste materials shall be incinerated or transported to shore for disposal.

C. Production Facilities.

- (1) All production facilities, such as separators, tanks, treaters, and other equipment, shall be such as are necessary to control the maximum anticipated pressures and production of oil, gas, and sulphur, and shall be maintained at all times in a manner necessary to prevent pollution.

(2) All platforms and structures shall be curbed and connected by drains to a collecting tank or sump unless drip pans, or equivalents, are placed under equipment, from which a pollutant may spill into the Gulf, and piped to a tank or sump.

(3) The operator's personnel shall be thoroughly instructed in the techniques of equipment maintenance and operation for the prevention of pollution. Non-operator personnel shall be informed in writing, prior to executing contracts, of the operator's obligations to prevent pollution.

2. Inspections and Reports. The operator shall comply with the following pollution inspection and reporting requirements:

A. Pollution Inspections.

(1) Manned facilities shall be inspected daily.

(2) Unattended facilities, including those equipped with remote control and monitoring systems, shall be inspected at frequent intervals. The district engineer may prescribe the frequency of inspections for these facilities.

B. Pollution Reports.

(1) All spills or leakage of oil and liquid pollutants shall be recorded showing the cause, size of spill, and action taken, and the record shall be maintained and available for inspection by the supervisor. All spills or leakage of less than 15 barrels shall be reported to the district engineer when requested by him.

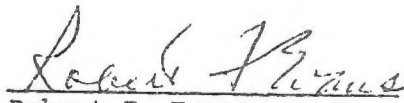
(2) All spills or leakage of oil and liquid pollutants of 15 to 50 barrels shall be reported orally to the district engineer without delay and shall be confirmed in writing.

(3) All spills or leakage of oil and liquid pollutants of a substantial size or quantity, which is defined as more than 50 barrels, and those of any size or quantity which cannot be immediately controlled, shall be reported orally without delay to the supervisor, the district engineer, the Coast Guard, and the Regional Director, Federal Water Pollution Control Administration. All oral reports shall be confirmed in writing.

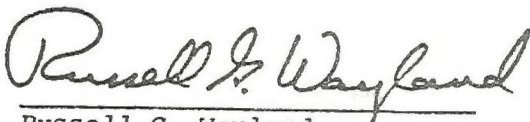
- (4) Operators shall notify each other upon observation of equipment malfunction or pollution resulting from another's operation.

3. Control and Removal.

- A. Corrective Action. Immediate corrective action shall be taken in all cases where pollution has occurred. Each operator shall have an emergency plan for initiating corrective action to control and remove pollution and such plan shall be filed with the supervisor. Corrective action taken under the plan shall be subject to modification when directed by the supervisor.
- B. Equipment. Standby pollution control equipment shall be maintained by or shall be immediately available to each operator at a land base location. This equipment shall include containment booms, skimming apparatus, and approved chemical dispersants and shall be available prior to the commencement of operations. The equipment shall be regularly inspected and maintained in good condition for use. The equipment and the location of land bases shall be approved by the supervisor. The operator shall notify the supervisor of the location at which such equipment is located for operations conducted on or for each lease. All changes in location and equipment maintained at each location shall be approved by the supervisor.


Robert F. Evans
Supervisor

Approved: August 28, 1969


Russell G. Wayland
Chief, Conservation Division

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CONSERVATION DIVISION
BRANCH OF OIL AND GAS OPERATIONS
GULF OF MEXICO AREA

NOTICE TO LESSEES AND OPERATORS OF FEDERAL LEASES IN THE
OUTER CONTINENTAL SHELF, GULF OF MEXICO AREA

APPROVAL PROCEDURE FOR INSTALLATION AND OPERATION OF PLATFORMS,
FIXED AND MOBILE STRUCTURES, AND ARTIFICIAL ISLANDS

This Order is established pursuant to the authority prescribed in 30 CFR 250.11 and in accordance with 30 CFR 250.19(a). Section 250.19(a) provides as follows:

- (a) The Supervisor is authorized to approve the design, other features, and plan of installation of all platforms, fixed structures, and artificial islands as a condition of the granting of a right of use or easement under Paragraphs (a) and (b) of Section 250.18 or authorized under any lease issued or maintained under the Act.

The operator shall be responsible for compliance with the requirements of this Order in the installation and operation of all platforms, fixed and mobile structures, and artificial islands, including all facilities installed on a platform or structure whether or not operated or owned by the operator. Any departures from the requirements specified in this Order must be approved pursuant to 30 CFR 250.12(b).

1. The following requirements are applicable to all platforms approved and installed subsequent to the effective date of this Order, and to all platforms when structural and equipment modifications are to be made:

- A. General Design. The design of platforms, fixed structures, and artificial islands shall include consideration of such factors as water depth, surface and subsurface soil conditions, wave and current forces, wind forces, total equipment weight, and other pertinent geological, geographical, environmental, and operational conditions.

B. Application. The operator shall submit, in duplicate, the following to the appropriate District Office for approval:

(1) Design Features. Information relative to design features on an 8" x 10½" plat or plats showing the platform dimensions, plan and two elevations, number and location of well slots, and water depth. In addition, the plat shall include:

- (a) Nominal size and thickness range of piling.
- (b) Nominal size and thickness range of jacket column leg.
- (c) Nominal size and thickness range of deck column leg.
- (d) Design piling penetration.
- (e) Maximum bearing and lateral load per pile in tons.
- (f) Identification data which shall be the lease number, block number, area, and operator.
- (g) The following certification signed and dated with the title of the company representative:

" Operator certifies that this platform has been certified by a registered professional engineer and that the structure will be constructed, operated, and maintained as described in the application, and any approved modification thereto. Certified plans are on file at _____."

(2) Non-design Features. Information relative to non-design features including the following:

- (a) Primary use intended, including drilling, production of oil and gas, sulphur, or salt.

- (b) Personnel and personnel transfer facilities including living quarters, boat landings, and heliport.
- (c) Type of deck, such as steel or wood, and whether coated with protective material.
- (d) Method of protection from corrosion.
- (e) Production facilities including separators, treaters, storage tanks, compressors, line pumps, and metering devices, except that when initially designed and utilized for drilling, this information may be submitted prior to installation.
- (f) Safety and pollution control equipment and features.
- (g) Other information when required.

C. Certified Plan. Detailed structural plans certified by a registered professional engineer shall be on file and maintained by the operator or his designee.

2. Safety and Pollution Control Equipment and Procedures.

- A. The following requirements shall apply to all platforms. Operators of platforms installed prior to the effective date of this Order shall comply with the requirements of subparagraphs (1)(a) through (f), (2), and (3) within three months, with subparagraphs (1)(g) and (4) within six months, and with subparagraphs (5), (6), (7), (8), and (9) within one year, from the effective date of this Order.
- (1) The following shut-in devices shall be installed and maintained in an operating condition on all pressurized vessels and water separation facilities when such vessels and separation facilities are in service. The operator shall submit records to the appropriate District Office semi-annually showing the present status and past history of each device including dates and details of inspection, testing, repairing, adjustment, and reinstallation.

- (a) All separators shall be equipped with high-low pressure shut-in sensors, low level shut-in controls, and a relief valve. High liquid level control devices shall be installed when the vessel can discharge to a flare.
- (b) All pressure surge tanks shall be equipped with a high and low pressure shut-in sensor, a high level shut-in control, flare line, and relief valve.
- (c) Atmospheric surge tanks shall be equipped with a high level shut-in sensor.
- (d) All other hydrocarbon handling pressure vessels shall be equipped with high-low pressure shut-in sensors, high-low level shut-in controls, and relief valves, unless determined to be otherwise protected.
- (e) Pilot-operated pressure relief valves shall be equipped to permit testing with an external pressure source. Spring-loaded pressure relief valves shall either be bench-tested or equipped to permit testing with an external pressure source. A relief valve shall be set no higher than the designed working pressure of the vessel. The high pressure shut-in sensor shall be set no higher than 5% below the rated or designed working pressure and the low pressure shut-in sensor shall be set no lower than 10% below the lowest pressure in the operating pressure range on all vessels with a rated or designed working pressure of more than 400 psi. On lower pressure vessels the above percentages shall be used as guidelines for sensor settings considering pressure and operating conditions involved; except that sensor settings shall not be within 5 psi of the rated or designed working pressure or the lowest pressure in the operating pressure range.
- (f) All sensors shall be equipped to permit testing with an external pressure source.
- (g) All flare lines shall be equipped with a scrubber or similar separation equipment.

(2) The following remote and local automatic shut-in devices shall be installed and maintained in an operating condition at all times when the affected well (or wells) is producing. The operator shall submit records to the appropriate District Office semi-annually showing the present status and past history of each such device including dates and details of inspection, testing, repairing, adjustment, and reinstallation.

- (a) All wellhead assemblies shall be equipped with an automatic fail-close valve. Automatic safety valves temporarily out of service shall be flagged.
- (b) All flowlines from wellheads shall be equipped with high-low pressure sensors located close to the wellhead. The pressure sensors shall be set to activate the wellhead valve in the event of abnormal pressures in the flowline.
- (c) All headers shall be equipped with check valves on the individual flowlines. The flowline and valves from each well located upstream of, and including, the header valves shall withstand the shut-in pressure of that well, unless protected by a relief valve with connections to bypass the header. If there is an inlet valve to a separator, the valve, flowline, and all equipment upstream of the valve shall also withstand shut-in wellhead pressure, unless protected by a relief valve with connections to bypass the header.
- (d) All pneumatic shut-in control lines shall be equipped with fusible material at strategic points.
- (e) Remote shut-in controls shall be located on the helicopter deck and all exit stairway landings, including at least one on each boat landing. These controls shall be quick-opening valves.

- (f) All pressure sensors shall be tested for proper pressure settings monthly for at least four months. At such time as the monthly results are consistent, a quarterly test shall be required for at least one year. If these results are consistent, a longer period of time between testing may then be approved by the Supervisor. In the event any testing sequence reveals inconsistent results, the monthly testing sequence shall be reinstituted. Results of all tests shall be recorded and maintained in the field.
- (g) All automatic wellhead safety valves shall be tested for operation weekly. All automatic wellhead safety valves shall be tested for holding pressure monthly. If these results are consistent, a longer period of time between pressure tests, not to exceed quarterly, may then be approved by the Supervisor. In the event that any pressure testing sequence, exceeding monthly, reveals inconsistent results, the monthly testing sequence shall be reinstituted. Results of all tests shall be recorded and maintained in the field.
- (h) Check valves shall be tested for holding pressure monthly for at least four months. At such time as the monthly results are satisfactory, a quarterly test shall be required for at least one year. If these results are consistent, a longer period of time between testing may then be approved by the Supervisor. In the event any testing sequence reveals inconsistent results, the monthly testing sequence shall be reinstituted. Results of all tests shall be recorded and maintained in the field.
- (i) A complete testing and inspection of the safety system shall be witnessed by Geological Survey representatives at the time production is commenced. Thereafter, the operator shall arrange for a test every six months. The test shall be conducted when it can be witnessed by Geological Survey representatives.

(j) A standard procedure for testing of safety equipment shall be prepared and posted in a prominent place on the platform.

- (3) Curbs, gutters, and drains shall be constructed in all deck areas in a manner necessary to collect all contaminants, unless drip pans or equivalent are placed under equipment and piped to a sump which will automatically maintain the oil at a level sufficient to prevent discharge of oil into the Gulf waters. Alternate methods to obtain the same results will be acceptable. These systems shall not permit spilled oil to flow into the wellhead area.
- (4) An auxiliary electrical power supply shall be installed to provide emergency power capable of operating all electrical equipment required to maintain safety of operation in the event the primary electrical power supply fails.
- (5) The following requirements shall apply to the handling and disposal of all produced waste water discharged into the Gulf of Mexico. The disposal of waste water other than into the Gulf waters shall have the method and location approved by the Supervisor.
 - (a) Water discharged shall not create conditions which will adversely affect the public health or the use of the waters for the propagation of aquatic life, recreation, navigation, or other legitimate uses.
 - (b) Waste water disposal systems shall be designed and maintained to reduce the oil content of the disposed water to an average of not more than fifty ppm. An effluent sampling station shall be located at a point prior to discharge into the receiving waters where a representative sample of the treated effluent can be obtained. On one day each month four effluent samples shall be taken within a 24-hour period and determinations shall be made on the temperature, suspended solids, settleable solids, pH, total oil content, and volume of sample obtained.

All samples shall be taken and all analyses for oil content shall be performed in accordance with the American Society for Testing and Materials test D1340, "Oily Matter in Industrial Waste Water". The Supervisor may approve different methods for determination of oil content if the method to be used is indicated to be reliable. No effluent containing in excess of one hundred ppm of total oil content shall be discharged into the Gulf of Mexico. A written report of the results shall be furnished to the Regional Office annually. The report shall contain dates, time and location of sample, volumes of waste discharge on the date of sampling in barrels per day, and the results of the specific analysis and physical observations.

(6) A firefighting system shall be installed and maintained in an operating condition in accordance with the following:

- (a) A fixed automatic water spray system shall be installed in all inadequately ventilated well-head areas as these areas are defined in Paragraph 9 API RP 500A. These systems shall be installed in accordance with the most current edition of National Fire Protection Association's Pamphlet No. 15.
- (b) A firewater system of rigid pipe with fire hose stations shall be installed and may include a fixed water spray system. Such a system shall be installed in a manner necessary to provide needed protection in areas where production handling equipment is located. A firefighting system using chemicals may be considered for installation in certain platform areas in lieu of a firewater system in that area, if determined to provide equivalent fire protection control.
- (c) Pumps for the firewater systems shall be inspected and test-operated weekly. A record of the tests shall be maintained in the field and submitted semi-annually to the appropriate District Office. An alternate fuel or power source shall be installed to provide continued pump operation during platform shutdown unless an alternate firefighting system is provided.

- (d) Portable fire extinguishers shall be located in the living quarters and in other strategic areas.
 - (e) A diagram of the firefighting system showing the location of all equipment shall be posted in a prominent place on the platform and a copy submitted to the appropriate District Office.
- (7) An automatic gas detector and alarm system shall be installed and maintained in an operating condition in accordance with the following:
- (a) Gas detection systems shall be installed in all enclosed areas containing gas handling facilities or equipment and in other enclosed areas which are classified as hazardous areas as defined in API RP 500 and the most current edition of the National Electric Code.
 - (b) All gas detection systems shall be capable of continuously monitoring for the presence of combustible gas in the areas in which the detection devices are located.
 - (c) The central control shall be capable of giving an alarm at some point below the lower explosive limit of 1.3% as shown in the Bureau of Mines Bulletin No. 503. This low level shall be for alarm purposes only.
 - (d) A high level setting of not more than 4.9% shall be used for shut-in sequences and the operation of emergency equipment.
 - (e) An application for the installation and maintenance of any gas detection system shall be filed with the appropriate District Office for approval. The application shall include the following:
 - (i) Type, location, and number of detection or sampling heads.
 - (ii) Cycling, noncycling, and frequency information.
 - (iii) Type and kind of alarm including emergency equipment to be activated.

- (iv) Method used for detection of combustible gas.
 - (v) Method and frequency of calibration.
 - (vi) A diagram of the gas detection system.
 - (vii) Other pertinent information.
 - (f) A diagram of the gas detection system showing the location of all gas detection points shall be posted in a prominent place on the platform.
- (8) The following requirements shall be applicable to all electrical equipment and systems installed:
- (a) All engines shall be equipped with low-tension ignition systems containing rigid connections and shielded wiring which shall prevent the release of sufficient electrical energy under normal or abnormal conditions to cause ignition of a combustible mixture.
 - (b) All electrical generators, motors, and lighting systems shall be installed, protected, and maintained in accordance with the most current edition of the National Electric Code and API RP 500A and B, as appropriate.
 - (c) Marine-armored cable or metal-clad cable may be substituted for wire in conduit in any area.
- (9) Sewage disposal systems shall be installed and used in all cases where sewage is discharged into the Gulf of Mexico. Sewage is defined as human body wastes and the wastes from toilets and other receptacles intended to receive or retain body wastes. Following sewage treatment, the effluent shall contain 50 ppm or less of biochemical oxygen demand (BOD), 150 ppm or less of suspended solids, and shall have a minimum chlorine residual of 1.0 mg/liter after a minimum retention time of fifteen minutes.

B. The requirements of subparagraphs 2.A(3), (4), (8), and (9) shall apply to all mobile drilling structures used to conduct drilling or workover operations on Federal leases in the Gulf of Mexico.

Robert F. Evans

Robert F. Evans,
Supervisor

Approved: October 30, 1970

Russell G. Wayland

Russell G. Wayland
Chief, Conservation Division

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CONSERVATION DIVISION
BRANCH OF OIL AND GAS OPERATIONS
GULF OF MEXICO AREA

NOTICE TO LESSEES AND OPERATORS OF FEDERAL OIL AND GAS LEASES
IN THE OUTER CONTINENTAL SHELF, GULF OF MEXICO AREA

APPROVAL PROCEDURE FOR OIL AND GAS PIPELINES

This Order is established pursuant to the authority prescribed in 30 CFR 250.11 and in accordance with 30 CFR 250.19(b). Section 250.19(b) provides as follows:

- (b) The Supervisor is authorized to approve the design, other features, and plan of installation of all pipelines for which a right of use or easement has been granted under Paragraph (c) of Section 250.18 or authorized under any lease issued or maintained under the Act, including those portions of such lines which extend onto or traverse areas other than the Outer Continental Shelf.

The operator shall comply with the following requirements. Any departures from the requirements specified in this Order must be approved pursuant to 30 CFR 250.12(b).

1. General Design. All pipelines shall be designed and maintained in accordance with the following:
 - A. The operator shall be responsible for the installation of the following control devices on all oil and gas pipelines connected to a platform including pipelines which are not operated or owned by the operator. Operators of platforms installed prior to the effective date of this Order shall comply with the requirements of subparagraphs (1) and (2) within six months of the effective date of this Order. The operator shall submit records semi-annually showing the present status and past history of each device, including dates and details of inspection, testing, repairing, adjustment, and reinstallation.
 - (1) All oil and gas pipelines leaving a platform receiving production from the platform shall be equipped with a high-low pressure sensor to directly or indirectly shut-in the wells on the platform.

- (2) (a) All oil and gas pipelines delivering production to production facilities on a platform shall be equipped with an automatic shut-in valve connected to the platform's automatic and remote shut-in system.
- (b) All oil and gas pipelines coming onto a platform shall be equipped with a check valve to avoid backflow.
- (c) Any oil or gas pipelines crossing a platform which do not deliver production to the platform, but which may or may not receive production from the platform, shall be equipped with high-low pressure sensors to activate an automatic shut-in valve to be located in the upstream portion of the pipeline at the platform. This automatic shut-in valve shall be connected to either the platform automatic and remote shut-in system or to an independent remote shut-in system.
- (d) All pipeline pumps shall be equipped with high-low pressure shut-in devices.
- B. All pipelines shall be protected from loss of metal by corrosion that would endanger the strength and safety of the lines either by providing extra metal for corrosion allowance, or by some means of preventing loss of metal such as protective coatings or cathodic protection.
- C. All pipelines shall be installed and maintained to be compatible with trawling operations and other uses.
- D. All pipelines shall be hydrostatically tested to 1.25 times the designed working pressure for a minimum of 2 hours prior to placing the line in service.
- E. All pipelines shall be maintained in good operating condition at all times and inspected monthly for indication of leakage using aircraft, floating equipment, or other methods. Records of these inspections including the date, methods, and results of each inspection shall be maintained by the pipeline operator and submitted annually by April 1. The pipeline operator shall submit records indicating the cause, effect, and remedial action taken regarding all pipeline leaks within one week following each such occurrence.

F. All pipelines shall be designed to be protected against water currents, storm scouring, soft bottoms, and other environmental factors.

2. Application. The operator shall submit in duplicate the following to the Supervisor for approval:

- A. Drawing on 8" x 10½" plat or plats showing the major features and other pertinent data including: (1) water depth, (2) route, (3) location, (4) length, (5) connecting facilities, (6) size, and (7) burial depth, if buried.
- B. A schematic drawing showing the following pipeline safety equipment and the manner in which the equipment functions: (1) high-low pressure sensors, (2) automatic shut-in valves, and (3) check valves.
- C. General information concerning the pipeline including the following:
 - (1) Product or products to be transported by the pipeline.
 - (2) Size, weight, and grade of the pipe.
 - (3) Length of line.
 - (4) Maximum water depth.
 - (5) Type or types of corrosion protection.
 - (6) Description of protective coating.
 - (7) Bulk specific gravity of line (with the line empty).
 - (8) Anticipated gravity or density of the product or products.
 - (9) Design working pressure and capacity.
 - (10) Maximum working pressure and capacity.
 - (11) Hydrostatic pressure and hold time to which the line will be tested after installation.
 - (12) Size and location of pumps and prime movers.
 - (13) Any other pertinent information as the Supervisor may prescribe

3. Completion Report. The operator shall notify the Supervisor when installation of the pipeline is completed and submit a drawing on 8" x 10½" plats showing the location of the line as installed, accompanied by all hydrostatic test data including procedure, test pressure, hold time, and results.

Robert F. Evans
Robert F. Evans
Supervisor

Approved: October 30, 1970

Russell G. Wayland
Russell G. Wayland
Chief, Conservation Division

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CONSERVATION DIVISION
BRANCH OF OIL AND GAS OPERATIONS
GULF OF MEXICO AREA

NOTICE TO LESSEES AND OPERATORS OF FEDERAL SULPHUR LEASES
IN THE OUTER CONTINENTAL SHELF, GULF OF MEXICO AREA

SULPHUR DRILLING PROCEDURES OFF LOUISIANA AND TEXAS

This Order is established pursuant to the authority prescribed in 30 CFR 250.11 and in accordance with 30 CFR 250.34, 250.41, and 250.91. All exploratory core holes for sulphur and all sulphur development wells shall be drilled in accordance with the provisions of this Order, except that development wells shall be drilled in accordance with field rules when established by the supervisor. Each Application to Drill (Form 9-331C) shall include all information required under 30 CFR 250.91 and the integrated casing, cementing, mud, and blowout prevention program for the well. The operator shall comply with the following requirements. Any departures from the requirements specified in this Order must be approved pursuant to 30 CFR 250.12(b).

1. Well Casing and Cementing. All wells shall be cased and cemented in accordance with the requirements of 30 CFR 250.41(a)(1). Special consideration to casing design shall be given to compensate for effects caused by subsidence, corrosion, and temperature variation. All depths refer to true vertical depth (TVD).
 - A. Drive or Structural Casing. This casing shall be set by drilling, driving, or jetting to a minimum depth of 100 feet below the Gulf floor, or to such greater depth required to support unconsolidated deposits and to provide hole stability for initial drilling operations. If drilled in, the drilling fluid shall be a type that will not pollute the Gulf, and a quantity of cement sufficient to fill the annular space back to the Gulf floor must be used.
 - B. Conductor Casing. This casing shall be set and cemented before drilling into shallow formations known to contain hydrocarbons or, if unknown, upon encountering such formations. Conductor casing shall extend to a depth of not less than 350 feet nor more than 750 feet below the Gulf floor. A quantity of cement sufficient to fill

the annular space back to the Gulf floor must be used. The cement may be washed out or displaced to a depth of 40 feet below the Gulf floor to facilitate casing removal upon well abandonment.

- C. Caprock Casing. This casing shall be set at the top of the caprock and be cemented with a quantity of cement sufficient to fill the annular space back to the Gulf floor. Stage cementing or other cementing method shall be used to insure cement returns to the Gulf floor.
2. Blowout Prevention Equipment. Blowout preventers and related well control equipment shall be installed, used, and tested in a manner necessary to prevent blowouts. Prior to drilling below the conductor casing, blowout prevention equipment shall be installed and maintained ready for use until drilling operations are completed, as follows:
- A. Conductor Casing. Before drilling below this string, at least one remotely controlled bag-type blowout preventer and equipment for circulating the drilling fluid to the drilling structure or vessel shall be installed. To avoid formation fracturing from complete shut-in of the well, a large diameter pipe with control valves shall be installed on the conductor casing below the blowout preventer so as to permit the diversion of hydrocarbons and other fluids; except that when the blowout preventer assembly is on the Gulf floor, the choke and kill lines shall be equipped to permit the diversion of hydrocarbons and other fluids.
 - B. Caprock Casing. Before drilling below this string, the blowout prevention equipment shall include a minimum of: (1) three remotely controlled, hydraulically operated, blowout preventers with a working pressure which exceeds the maximum anticipated surface pressure, including one equipped with pipe rams, one with blind rams, and one bag-type; (2) a drilling spool with side outlets, if side outlets are not provided in the blowout preventer body; (3) a choke manifold; (4) a kill line; and (5) a fill-up line.

- C. Testing. Ram-type blowout preventers and related control equipment shall be tested with water to the rated working pressure of the stack assembly, or to the working pressure of the casing, whichever is the lesser, (1) when installed; (2) before drilling out after each string of casing is set; (3) not less than once each week while drilling; and (4) following repairs that require disconnecting a pressure seal in the assembly. The bag-type blowout preventer shall be tested to 70 percent of the above pressure requirements.

While drill pipe is in use ram-type blowout preventers shall be actuated to test proper functioning once each day. The bag-type blowout preventer shall be actuated on the drill pipe once each week. Accumulators or accumulators and pumps shall maintain a pressure capacity reserve at all times to provide for repeated operation of hydraulic preventers. A blowout prevention drill shall be conducted weekly for each drilling crew to insure that all equipment is operational and that crews are properly trained to carry out emergency duties. All blowout preventer tests and crew drills shall be recorded on the driller's log.

- D. Other Equipment. A drill string safety valve in the open position shall be maintained on the rig floor at all times while drilling operations are being conducted. Separate valves shall be maintained on the rig floor to fit all pipe in the drill string. A Kelly cock shall be installed below the swivel.

- 3) Mud Program - General. The characteristics, use, and testing of drilling mud and the conduct of related drilling procedures shall be such as are necessary to prevent the blowout of any well. Quantities of mud materials sufficient to insure well control shall be maintained readily accessible for use at all times. The following mud control and testing equipment requirements are applicable to operations conducted prior to drilling below the caprock casing.

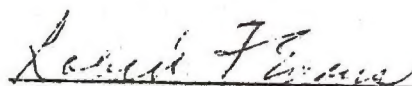
- A. Mud Control. Before starting out of the hole with drill pipe, the mud shall be circulated with the drill pipe just off bottom until the mud is properly conditioned. When coming out of the hole with drill pipe, the annulus shall be filled with mud before the mud level drops below 100 feet, and a mechanical device for measuring the amount of mud required to fill the hole shall be utilized. The volume of mud required to fill the hole shall be watched,

and any time there is an indication of swabbing, or influx of formation fluids, the drill pipe shall be run to bottom, and the mud properly conditioned. The mud shall not be circulated and conditioned except on or near bottom, unless well conditions prevent running the pipe to bottom.

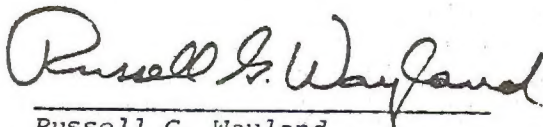
- B. Mud Testing and Equipment. Mud testing equipment shall be maintained on the drilling platform at all times, and mud tests shall be performed daily, or more frequently as conditions warrant.

The following mud system monitoring equipment must be installed (with derrick floor indicators) and used throughout the period of drilling after setting and cementing the conductor casing:

- (1) Recording mud pit level indicator to determine mud pit volume gains and losses. This indicator shall include a visual or audio warning device.
- (2) Mud volume measuring device for accurately determining mud volumes required to fill the hole on trips.
- (3) Mud return indicator to determine that returns essentially equal the pump discharge rate.


Robert F. Evans
Supervisor

Approved: August 28, 1969


Russell G. Wayland
Chief, Conservation Division

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CONSERVATION DIVISION
BRANCH OF OIL AND GAS OPERATIONS
GULF OF MEXICO AREA

NOTICE TO LESSEES AND OPERATORS OF FEDERAL OIL AND GAS LEASES
IN THE OUTER CONTINENTAL SHELF, GULF OF MEXICO AREA

INTERIM OIL AND GAS PRODUCTION RATES

This Interim Order is established pursuant to the authority prescribed in 30 CFR 250.11 and in accordance with 30 CFR 250.16 and supersedes Interim OCS Order No. 11, dated December 11, 1970, and the first and second revisions thereof, dated February 11, 1971, and March 29, 1971, respectively. The provisions of this Interim Order and the maximum production rates heretofore approved under Interim Order No. 11, dated December 11, 1970, will remain in full force and effect until superseded, amended, or terminated. 30 CFR 250.16 provides as follows:

Well potentials and permissible flow. The supervisor is authorized to specify the time and method for determining the potential capacity of any well and to fix, after appropriate notice, the permissible production of any such well that may be produced when such action is necessary to prevent waste or to conform with such proration rules, schedules, or procedures as may be established by the Secretary.

In accordance with the notice appearing in the Federal Register, dated December 5, 1970 (35 F.R. 18559), the provisions of this Order are applicable to all oil and gas wells located on the Outer Continental Shelf of the Gulf of Mexico off the State of Texas and the undisputed areas off the State of Louisiana; provided, however, this order shall not apply to any wells on oil and gas leases situated landward of the line, or transected by the line, described in paragraph 3 of the Supplemental Decree entered December 20, 1971, in United States v. Louisiana, S. Ct. No. 9, Original (40 L.W. 3287). Any departures from the requirements specified in this Order shall be subject to approval pursuant to 30 CFR 250.12 (b).

1. Maximum Production Rates.

- A. Producible Wells. Effective May 1, 1972, all producible oil and gas wells and reservoirs may be produced at daily rates not to exceed the Maximum Efficient Rate (MER), subject to the limitations set forth in paragraph 5 below.
- B. New Completions and Recompletions. New oil and gas well completions and recompletions shall be produced at a rate established by the Supervisor. A testing period not to exceed 30 days will be allowed prior to setting the maximum production rate for the well. At the end of the testing period, the operator shall submit a detailed determination of the MER justifying a proposed maximum rate of production for the Supervisor's approval. The initial production test of all completions and recompletions may be witnessed by a representative of the Supervisor.

2. Definition of MER. The MER is defined as that rate for each reservoir and each well which, if exceeded, would lead to avoidable underground waste through loss of ultimate recovery of oil and gas from that reservoir. It is dependent on the recovery mechanism operative for the current producing period, and is based on engineering and geological information.

3. Determination of MER. On or before May 1, 1972, each operator shall submit reports, for approval by the Supervisor, showing the operator's estimate of the MER for each oil and gas well and reservoir on those leases in the area removed from dispute in United States v. Louisiana, S. Ct. No. 9, Original, by entry of the Supplemental Decree of December 20, 1971, in that litigation (40 L.W. 3287). Reports shall be identified by the name of the field, the OCS lease number, the well number, and the designation and depth of the productive zone. As soon as available and prior to July 1, 1972, each operator shall submit the technical information and methods used to determine the MER applicable to each well and reservoir.

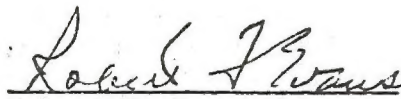
Revisions in the operator's estimate of the MER for oil and gas wells and reservoirs located on leases subject to this Interim Order shall be submitted to the Supervisor for approval.

4. Reports. Each operator shall submit the following reports for each lease separately to the Regional Office. Initial reports for those leases in the area removed from dispute, referred to in Paragraph 3 above, shall be for the month of April 1972 for the reports required in A, C, and D, below, and for the quarter ending April 1, 1972, for the report required in B below.

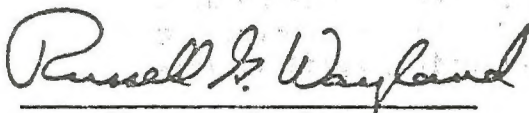
- A. A monthly well potential report on a form identical to the Louisiana Department of Conservation Form DM-1R. This report shall be submitted for each month by the 10th day of each succeeding month.
- B. A gas well deliverability test report on a form identical to the Louisiana Department of Conservation Form DT-1, shall be submitted by January 1, April 1, July 1, and October 1.
- C. A monthly producer's crude oil and/or condensate report on a form identical to Louisiana Department of Conservation Form R-1. This report shall be submitted for each month by the 25th day of each succeeding month.
- D. A monthly producer's natural gas report on a form identical to Louisiana Department of Conservation Form R-5P. This report shall be submitted for each month by the last day of each succeeding month.

5. Limitations on Production.

- A. Production rates shall not result in venting or flaring of gas in violation of the Operating Regulations in 30 CFR 250.30.
- B. In order to provide safe operating conditions and prevent pollution, oil and gas production rates shall not exceed the operating capacity of production, transportation, and storage facilities, including, but not limited to, separators, dehydrators, compressors, surge tanks, and pipelines. All producing operations shall be in accordance with the provisions of OCS Orders Nos. 5, 7, 8 and 9. Production rates shall be maintained at a level to permit efficient operation of subsurface safety devices.


Robert F. Evans
Supervisor

Approved:


Russell G. Wayland
Chief, Conservation Division

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CONSERVATION DIVISION
BRANCH OF OIL AND GAS OPERATIONS
GULF OF MEXICO AREA

NOTICE TO LESSEES AND OPERATORS OF FEDERAL LEASES IN THE
OUTER CONTINENTAL SHELF, GULF OF MEXICO AREA

PUBLIC INSPECTION OF RECORDS

This Interim Order is established pursuant to the authority prescribed in 30 CFR 250.11 and in accordance with 30 CFR 250.97 and 43 CFR 2.2. Section 250.97 of 30 CFR provides as follows:

Public Inspection of Records. Geological and geophysical interpretations, maps, and data required to be submitted under this part shall not be available for public inspection without the consent of the lessee so long as the lease remains in effect or until such time as the supervisor determines that release of such information is required and necessary for the proper development of the field or area.

Section 2.2 of 43 CFR provides in part as follows:

Determinations as to Availability of Records. (a) Section 552 of Title 5, U.S. Code, as amended by Public Law 90-23. (the act codifying the "Public Information Act") requires that identifiable agency records be made available for inspection. Subsection (b)¹ of section 552 exempts several categories of records from the general requirement but does not require the withholding from inspection of all records which may fall within the categories exempted. Accordingly, no request made of a field office to inspect a record shall be denied unless the head of the office or such higher field authority as the head of the bureau may designate shall determine (1) that the record falls within one or more of

¹Subsection (b) of section 552 provides that:

(b) This section does not apply to matters that are--

(4) Trade secrets and commercial or financial information obtained from a person and privileged or confidential;

(9) Geological and geophysical information and data, including maps, concerning wells.

the categories exempted and (2) either that disclosure is prohibited by statute or Executive Order or that sound grounds exist which require the invocation of the exemption. A request to inspect a record located in the headquarters office or a bureau shall not be denied except on the basis of a similar determination made by the head of the bureau or his designee, and a request made to inspect a record located in a major organizational unit of the Office of the Secretary shall not be denied except on the basis of a similar determination by the head of that unit. Officers and employees of the Department shall be guided by the "Attorney General's Memorandum on the Public Information Section of the Administrative Procedure Act" of June 1967.

(b) An applicant may appeal from a determination that a record is not available for inspection to the Solicitor of the Department of the Interior, who may exercise all of the authority of the Secretary of the Interior in this regard. The Deputy Solicitor may decide such appeals and may exercise all of the authority of the Secretary in this regard.

The operator shall comply with the requirements of this Order. Any departures from the requirements specified in this Order shall be subject to approval pursuant to 30 CFR 250.12(b).

1. Availability of Records Filed on or after December 1, 1970. It has been determined that certain records pertaining to leases and wells in the Outer Continental Shelf and submitted under 30 CFR 250 shall be made available for public inspection, as specified below, in the Area office, Metairie, Louisiana.

A. Form 9-152 - Monthly Report of Operations. All information contained on this form shall be available except the information required in the Remarks column.

B. Form 9-330 - Well Completion or Recompletion Report and Log.
(1) Prior to commencement of production all information contained on this form shall be available except Item 1a, Type of Well; Item 4, Location of Well, At top prod. interval reported below; Item 22, if Multiple Compl., How many; Item 24, Producing Interval; Item 26, Type Electric and Other Logs Run; Item 28, Casing Record; Item 29, Liner Record; Item 30, Tubing Record; Item 31, Perforation Record; Item 32, Acid, Shot, Fracture, Cement Squeeze, etc.; Item 33, Production; Item 37, Summary of Porous Zones; and Item 38, Geologic Markers.

(2) After commencement of production all information shall be available except Item 37, Summary of Porous Zones; and Item 38, Geologic Markers.

(3) If production has not commenced after an elapsed time of five years from the date of filing Form 9-330 as required in 30 CFR 250.38(b), all information contained on this form shall be available except Item 37, Summary of Porous Zones; and Item 38, Geologic Markers. Within 90 days prior to the end of the five-year period the lessee or operator may submit objections to the release of such information. The supervisor, taking into consideration the objections of the lessee, proximity to unleased lands, and the best interests of the United States, may determine that such information shall not be released.

C. Form 9-331 - Sundry Notices and Report on Wells. (1) When used as a "Notice of Intention to" conduct operations, all information contained on this form shall be available except Item 4, Location of Well, At top prod. interval; and Item 17, Describe Proposed or Completed Operations.

(2) When used as a "Subsequent Report of" operations, and after commencement of production, all information contained on this form shall be available except information under Item 17 as to subsurface locations and measured and true vertical depths for all markers and zones not placed on production.

D. Form 9-331C - Application for Permit to Drill, Deepen or Plug Back. All information contained on this form, and location plat attached thereto, shall be available except Item 4, Location of Well, At proposed prod. zone; and Item 23, Proposed Casing and Cementing Program.

E. Sales of Lease Production. Information contained on monthly Geological Survey computer printout showing sales of production of oil, condensate, gas and liquid products, by lease, shall be made available.

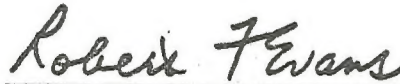
2. Filing of Reports. All reports on Forms 9-152, 9-330, 9-331, and 9-331C shall be filed in accordance with the following:

A. All reports submitted on these forms after the effective date of this Order shall be filed in two separate sets. All items on the forms in one set shall be completed in full and such forms, and all attachments thereto, shall not be available for public inspection. The additional set shall be completed in full, except that the items described in 1.(A), (B), (C), and (D) above, and the attachments relating to such items, may be excluded. The words "Public Information" shall be shown on the lower right-hand corner of this set. This additional set shall be made available for public inspection.

B. Copies of reports on these forms which were filed between December 1, 1970, and the effective date of this Order, shall be resubmitted (in duplicate or triplicate, as provided by

the regulations) within 30 days after the effective date of this Order. These reports may exclude the items described in 1. (A), (B), (C), and (D) above, and shall show the words "Public Information" on the lower right-hand corner and shall be made available for public inspection.

3. Availability of Records Filed Prior to December 1, 1970.
Information filed prior to December 1, 1970, on the forms referred to in (1) above, is not in a form which can be readily made available for public inspection. Requests for information on these forms shall be submitted to the supervisor in writing and shall be made available in accordance with 43 CFR Part 2.



Robert F. Evans
Supervisor

Approved: August 13, 1971



Russell G. Wayland
Chief, Conservation Division

ATTACHMENT B

PROPOSED SCHEDULE - PROVISIONAL OCS LEASING

George L. Turcott
Acting Director
Bureau of Land Management

ATTACHMENT 2

15

The holding of sale 43 is contingent upon the outcome of pending litigation with Alaska regarding jurisdiction over this area.

INT: 149-73

ATTACHMENT C

DESCRIPTION OF BLOCKS BY WATER DEPTH, DISTANCE FROM
SHORE, ACREAGE

LIST OF TRACTS PROPOSED FOR LEASING IN SALE #36

<u>Tract</u>	<u>Block</u>	<u>Area</u>	<u>Type</u> <u>Res.</u>	<u>Distance</u> <u>From Shore</u> <u>(Statute Miles)</u>	<u>Water Depth</u> <u>(Meters)</u>	<u>Acreage</u>
<u>West Cameron</u>						
1	22	All 1/	WC/G	4	8	3095 EST.
2	23	All 1/	WC/G	4	8	3324 EST.
3	35	N $\frac{1}{2}$; SW $\frac{1}{4}$; N $\frac{1}{2}$ SE $\frac{1}{4}$; SW $\frac{1}{4}$ SE $\frac{1}{4}$	WC/G	6	7	4687.50
4	36	All	WC/G	7	7	5000
5	39	All	DEV/G	6	8	5000
6	42	All	WC/G	7	8	5000
7	43	All	WC/G	7	8	5000
8	44	NE $\frac{1}{4}$; S $\frac{1}{2}$ NW $\frac{1}{4}$; S $\frac{1}{2}$	DEV/G	6	8	4375
9	57	All	WC/G	9	9	5000
10	58	"	WC/G	10	9	5000
11	59	"	WC/G	10	9	5000
12	62	"	WC/G	10	9	5000
13	65	"	WC/G	9	7	5000
14	66	NW $\frac{1}{4}$; S $\frac{1}{2}$	DEV/G	9	7	3750
15	69	S $\frac{1}{2}$	WC/G	10	11	2500
16	114	All	WC/G	18	10	5000
17	115	"	WC/G	18	10	5000
18	116	"	WC/G	18	10	5000
19	147	"	WC/G	24	12	5000
20	181	W $\frac{1}{2}$	DEV/G	30	12	2500
21	204	All	WC/G	35	15	5000
22	205	"	WC/G	34	15	5000
23	237	"	WC/G	40	18	5000
24	238	"	WC/G	41	19	5000
25	248	"	WC/G	45	21	5000
26	249	"	WC/G	44	19	5000
27	252	"	WC/G	46	19	5000
28	253	"	WC/G	47	19	5000
29	282	"	WC/G	61	24	5000

West Cameron - West Addition

30	335	All	WC/G	48	19	5000
31	342	"	WC/G	51	19	5000
32	343	"	WC/G	52	19	5000
33	352	"	WC/G	50	21	5000
34	353	"	WC/G	54	21	5000

<u>Tract</u>	<u>Block</u>	<u>Area</u>	<u>Type Res.</u>	<u>Distance From Shore (Statute Miles)</u>	<u>Water Depth (Meters)</u>	<u>Acreage</u>
<u>West Cameron - West Addition</u>						
35	364	All	WC/G	57	22	5000
36	365	"	WC/G	57	22	5000
37	367	"	WC/G	59	22	5000
38	368	"	WC/G	59	22	5000
39	401	"	WC/G	69	24	5000
40	402	"	WC/G	69	24	5000
41	413	"	"	71	27	5000
42	414	"	"	71	27	5000
43	426	"	"	73	30	5000
44	427	"	"	73	30	5000
45	428	"	"	73	30	5000
46	441	"	"	77	30	5000
<u>West Cameron - South Addition</u>						
47	450	All	WC/G	78	37	5000
48	452	"	"	79	36	5000
49	453	"	"	79	36	5000
50	458	"	"	74	36	5000
51	459	"	"	74	36	5000
52	483	"	DEV/G	77	38	5000
53	487	"	DEV/G	82	39	5000
54	498	"	WC/G	90	45	5000
55	505	"	"	83	48	5000
56	512	"	"	86	51	5000
57	530	"	DEV/G	88	53	5000
58	536	"	"	91	54	5000
59	549	"	"	98	60	5000
60	553	"	"	95	60	5000
61	554	"	"	93	60	5000
62	609	"	WC/G	111	82	5000
63	628	"	"	114	105	5000
64	645	"	"	117	117	5000
<u>East Cameron</u>						
65	12	All	WC/G	9	11	5000
66	15	All <u>1/</u>	"	5	9	4650 EST.
67	23	All <u>1/</u>	DEV/G	5	9	4773 EST.
68	25	All	WC/G	8	11	5000
69	28	"	"	11	12	5000

<u>Tract</u>	<u>Block</u>	<u>Area</u>	<u>Type Res.</u>	<u>Distance From Shore (Statute Miles)</u>	<u>Water Depth (Meters)</u>	<u>Acreage</u>
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East Cameron

70	34	All	WC/G	8	12	5000
71	40	"	"	9	14	5000
72	41	"	DEV/G	11	13	5000
73	42	"	DR/G	12	13	5000
74	225	"	DEV/G	67	30	5000
75	228	"	WC/G	69	36	5000

East Cameron - South Addition

76	236	All	WC/G	68	36	3828.56
77	237	"	"	68	36	2500
78	241	"	"	70	36	5000
79	242	"	"	70	36	5000
80	243	"	"	72	36	5000
81	246	"	"	75	39	5000
82	262	"	"	78	42	5000
83	298	"	DEV/G	88	53	5000

Vermillion

84	22	All	WC/G	6	11	5000
85	23	"	DEV/G	6	9	5000
86	25	"	WC/G	5	7	5000
87	30	"	"	5	4	4661.38
88	31	"	"	7	4	4633.37
89	40	"	"	10	12	4194.99
90	55	"	"	13	8	5000
91	59	"	"	14	12	5000
92	60	"	"	14	13	5000
93	61	"	"	18	14	4307.19
94	65	"	"	16	10	5000
95	148	"	"	37	22	5000
96	155	"	"	41	24	5000
97	251	"	DR/G	66	39	4489.70

Vermillion - South Addition

98	308	All	WC/G	81	60	5000
99	309	"	"	81	60	5000
100	311	"	"	82	60	4273.11

<u>Tract</u>	<u>Block</u>	<u>Area</u>	<u>Type Res.</u>	<u>Distance From Shore (Statute Miles)</u>	<u>Water Depth (Meters)</u>	<u>Acreage</u>
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Vermillion - South Addition

101	314	All	WC/G	85	64	5000
102	315	"	"	85	64	5000
103	329	"	"	87	67	5000
104	330	"	"	87	67	5000
105	337	"	"	91	70	5000
106	338	"	"	91	70	5000
107	361	"	"	95	82	5000
108	373	"	"	99	91	5000

South Marsh Island - South Addition

109	110	All	WC/G	70	48	2851.63
110	111	"	"	73	51	2828.95
111	112	"	"	73	51	5000
112	113	"	DEV/G	74	51	5000
113	123	"	WC/G	76	54	5000
114	124	"	"	76	54	5000
115	125	"	"	76	54	5000
116	127	"	WC/OG	79	57	2783.59
117	129	"	WC/OG	80	57	5000
118	141	"	"	82	60	5000
119	144	"	"	85	67	5000
120	173	"	"	91	82	5000
121	174	"	"	93	82	2670.19
122	175	"	"	96	86	2647.51
123	189	"	"	99	100	5000
124	190	"	"	99	100	2624.83

South Marsh Island - North Addition

125	253	All <u>2/</u>	WC/OG	17	6	3305 EST
126	254	All	WC/OG	19	6	3282.51
127	265	"	"	24	6	5000
128	270	"	"	26	9	5000

Eugene Island

129	10	All <u>1/</u>	WC/OG	6	5	2303 EST.
130	24	All	"	9	6	5000
131	38	All <u>1/</u>	"	5	6	4378 EST.
132	58	All <u>1/</u>	WC/G	4	5	3864 EST.
133	78	All	"	11	7	5000
134	81	"	"	10	6	5000
135	82	"	"	11	7	5000

<u>Tract</u>	<u>Block</u>	<u>Area</u>	<u>Type</u> <u>Res.</u>	<u>Distance</u> <u>From Shore</u> <u>(Statute Miles)</u>	<u>Water Depth</u> <u>(Meters)</u>	<u>Acreage</u>
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Eugene Island

136	242	All	WC/G	54	39	5000
137	243	"	"	55	39	5000
138	261	"	WC/OG	55	42	5000

Eugene Island - South Addition

139	268	All	WC/G	66	54	5000
140	281	"	WC/OG	59	54	5000
141	282	"	WC/OG	59	57	5000
142	288	"	WC/G	66	57	5000
143	289	"	WC/G	67	57	5000
144	304	"	WC/OG	62	64	5000
145	316	"	"	69	67	5000
146	317	"	"	69	70	5000
147	318	"	"	68	73	5000
148	319	"	"	68	73	5000
149	326	"	"	70	76	5000
150	327	"	"	70	76	5000
151	328	"	"	72	73	5000
152	329	"	"	72	73	5000
153	340	"	"	72	82	5000
154	341	"	"	72	82	5000
155	377	"	"	86	92	5000
156	378	"	"	86	91	5000

Ship Shoal

157	68	All	WC/G	7	7	5000
158	90	"	"	9	6	5000
159	91	"	"	9	6	5000
160	92	"	DEV/G	11	9	5132.22
161	170	"	WC/OG	32	18	5000

Ship Shoal - South Addition

162	272	All	DEV/OG	60	64	5000
163	276	"	WC/OG	54	64	5000
164	291	N $\frac{1}{2}$; SE $\frac{1}{4}$	DEV/OG	57	67	3750
165	350	All	WC/OG	69	109	5000

<u>Tract</u>	<u>Block</u>	<u>Area</u>	<u>Type Res.</u>	<u>Distance From Shore (Statute Miles)</u>	<u>Water Depth (Meters)</u>	<u>Acreage</u>
<u>South Pelto</u>						
166	9	All	WC/G	7	9	5000
167	10	"	"	5	9	5000
<u>South Timbalier</u>						
168	25	All	WC/OG	9	18	2148.46
169	58	"	"	16	24	5000
170	59	"	"	16	27	5000
171	153	"	"	33	48	5000
172	154	"	"	33	54	2148.46
173	156	"	"	35	48	5000
174	157	"	"	35	45	5000
175	194	"	"	37	33	5000
<u>South Timbalier - South Addition</u>						
176	317	All	WC/G	66	158	5000
<u>Grand Isle</u>						
177	56	All	WC/OG	24	43	5000
<u>Grand Isle - South Addition</u>						
178	87	All	WC/OG	30	91	5000
179	88	"	"	31	73	4539.89
<u>West Delta</u>						
180	34	All	DR/OG	11	18	1533
181	63	"	WC/OG	15	37	5000
182	78	S $\frac{1}{2}$	DR/OG	9	36	2500
183	86	N $\frac{1}{2}$	"	7	55	2500
184	87	N $\frac{1}{2}$	"	8	58	2500
185	108	All <u>1/</u>	WC/OG	7	48	4924 EST.
186	109	<u>3/</u>	"	7	55	3500.85
<u>South Pass</u>						
187	17	<u>4/</u>	DR/O	4	36	1388.04
188	33	All	WC/OG	7	79	4999.96
189	50	"	"	10	182	4999.96
190	57&So. Pass, So. Add.			5	55	
	77	<u>5/</u>	DR/O	7	73	3007.52

<u>Tract</u>	<u>Block</u>	<u>Area</u>	<u>Type Res.</u>	<u>Distance From Shore (Statute Miles)</u>	<u>Water Depth (Meters)</u>	<u>Acreage</u>
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South Pass

191	58&So. Pass,			6	48	
	So. Add. 78	6/	DR/O	7	73	2362.33
192	59	7/	"	4	37	2564.19

South Pass - South & East Addition

193	71	A11	WC/OG	9	109	5000
194	72	A11	"	7	76	5000

Main Pass

195	28	A11	WC/OG	9	12	4994.55
196	29	"	"	11	13	4994.55
197	59	A11 1/	DEV/OG	11	21	320 EST.
198	73	A11 1/	WC/OG	8	48	4560 EST.
199	98	A11	WC/G	19	18	4994.55
200	115	"	WC/OG	10	13	4994.55
201	128	"	"	18	24	4994.55
202	129	"	"	19	31	4994.55
203	132	"	DEV/OG	24	45	4994.55
204	148	"	WC/OG	8	60	4999.96
205	151	"	"	9	64	4999.96

Main Pass - South & East Addition

206	160	A11	WC/G	21	37	4994.55
207	161	"	"	19	34	4994.55
208	162	"	"	20	34	4994.55
209	163	"	"	20	37	4994.55
210	236	"	DEV/OG	27	47	4994.55
211	295	"	DEV/O	24	64	4560.81
212	301	"	WC/OG	15	67	4999.96

Garden Banks

213	N636E097	A11	WC/G	133	210	5760
214	" E098	"	"	132	200	5760
215	" E100	"	"	131	250	5760
216	N637E100	"	"	128	225	5760
217	" E103	"	"	126	250	5760

<u>Tract</u>	<u>Block</u>	<u>Area</u>	<u>Type Res.</u>	<u>Distance From Shore (Statute Miles)</u>	<u>Water Depth (Meters)</u>	<u>Acreeage</u>
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Garden Banks

218	N637E105	A11	WC/G	125	250	5760
219	" E106	"	"	125	200	5760
220	" E107	"	"	125	200	5760
221	" E108	"	"	125	200	5760
222	" E121	"	"	118	400	5760
223	" E122	"	"	118	400	5760
224	" E123	"	"	118	400	5760
225	N638E102	"	"	124	210	5760
226	" E103	"	"	123	225	5760
227	" E106	"	"	121	200	5760
228	" E107	"	"	120	200	5760
229	" E108	"	"	120	200	5760
230	" E110	"	"	120	400	5760
231	" E112	"	"	119	350	5760
232	" E113	"	"	119	375	5760
233	" E114	"	"	118	375	5760
234	" E117	"	"	118	200	5760
235	" E118	"	"	117	200	5760
236	" E119	"	"	118	300	5760
237	" E121	"	"	118	400	5760
238	" E122	"	"	117	400	5760
239	" E123	"	"	117	300	5760
240	N639E102	"	"	120	200	5760
241	" E103	"	"	120	200	5760
242	" E106	"	"	119	180	5760
243	" E107	"	"	119	200	5760
244	" E112	"	"	118	250	5760
245	" E113	"	"	117	250	5760

New Orleans South No. 1

246	N637E127	A11	WC/G	106	400	5760
247	" E128	"	"	105	400	5760
248	" E129	"	"	105	400	5760
249	N638E127	"	"	104	325	5760
250	" E128	"	"	103	325	5760
251	" E129	"	"	104	325	5760

<u>Tract</u>	<u>Block</u>	<u>Area</u>	<u>Type Res.</u>	<u>Distance From Shore (Statute Miles)</u>	<u>Water Depth (Meters)</u>	<u>Acreage</u>
<u>New Orleans</u>						
252	N645E160	A11	WC/G	66	200	5760
253	" E161	"	"	66	250	5760
254	N646E160	"	"	67	170	3730.68
255	" E161	"	"	69	200	3982.36
256	N647E160	"	"	72	140	612.36
257	" E161	"	"	72	160	761.57
<u>Mobile South No. 2</u>						
258	N652E046	A11	WC/OG	52	225	5760
259	" E047	"	"	53	310	5760
260	N653E046	"	"	49	400	5760
261	" E047	"	"	50	400	5760
262	N655E046	"	"	43	425	5760
263	" E047	"	"	45	500	5760
264	" E049	"	WC/O	33	500	5760
265	" E050	"	"	31	500	5760
266	" E052	"	WC/OG	38	400	5760
267	" E053	"	"	37	400	5760
268	" E055	"	"	31	300	5760
269	" E056	"	"	30	250	5760
270	" E057	"	"	30	275	5760
271	N656E046	"	WC/O	36	400	5760
272	" E047	"	"	35	500	5760
273	" E049	"	DEV/O	31	200	3811.18
274	" E050	"	WC/OG	33	200	2318.09
275	" E052	"	"	28	180	5003.05
276	" E053	"	"	28	160	5760
277	" E055	"	"	27	180	3469.92
278	" E056	"	WC/O	24	180	4298.45
279	" E057	"	WC/OG	27	180	5760
280	N657E047	"	WC/O	31	400	5760
281	" E048	"	"	30	200	5760
282	" E052	"	WC/OG	26	120	1159.47
283	" E053	"	WC/OG	26	120	1291.95
284	N658E047	"	WC/O	31	200	2178.08
285	" E048	"	"	28	150	1965.79
286	N662E067	"	WC/OG	18	400	5760
287	" E068	"	"	21	500	5760
288	" E069	"	"	24	500	5760
289	N663E067	"	"	17	300	5760

<u>Tract</u>	<u>Block</u>	<u>Area</u>	<u>Type</u> <u>Res.</u>	<u>Distance</u> <u>From Shore</u> <u>(Statute Miles)</u>	<u>Water Depth</u> <u>(Meters)</u>	<u>Acreage</u>
<u>Mobile South No. 2</u>						
290	N663E068	A11	WC/OG	20	350	5760
291	" E069	"	"	24	350	5760
292	N664E067	"	"	16	200	5760
293	" E068	"	"	18	250	5760
294	" E069	"	"	22	300	5760

<u>Mobile South No. 1</u>						
295	N666E070	A11	WC/OG	20	200	5760

- 1/ That portion located seaward of the Third Supplemental Decree Line.
- 2/ That portion located more than three marine leagues seaward of a line extending from a point on Shell Keys at latitude 29°24'32.15"N., longitude 91°51'16.59" W. (x = 1,834,019, y = 270,301), northwesterly in a straight line to Tigre Point at latitude 29°32'23.13" N., longitude 92°14'57.15" W. (x = 1,708,756, y = 318,661). The coordinates used refer to the Louisiana Plan Coordinate System, South Zone.
- 3/ That portion of Block 109 more than one foot seaward of the Third Supplemental Decree Line /404 U.S. 388 (Dec. 20, 1971)/.
- 4/ That portion of Block 17 seaward of the Fourth Supplemental Decree Line /409 U.S. 17 (Oct. 16, 1972)/.
- 5/ That portion of Block 57 between the line one foot seaward of the Third Supplemental Decree Line /404 U.S. 388 (Dec. 20, 1971)/, and the line three geographical miles seaward of the First Supplemental Decree Line /382 U.S. 288 (Dec. 13, 1965)/ and that portion of Block 77 less than three geographical miles seaward of the First Supplemental Decree Line /382 U.S. 288 (Dec. 13, 1965)/.
- 6/ Those portions of Blocks 58 and 78 between the line one foot seaward of the Third Supplemental Decree Line /404 U.S. 388 (Dec. 20, 1971)/ and the line three geographical miles seaward of the First Supplemental Decree Line /382 U.S. 288 (Dec. 13, 1965)/.
- 7/ That portion of Block 59 between the Fourth Supplemental Decree Line /409 U.S. 17 (Oct. 16, 1972)/ and a line three geographical miles seaward from the First Supplemental Decree Line /382 U.S. 288 (Dec. 13, 1965)/.

ATTACHMENT D

REPORT OF THE

WORK GROUP ON OCS SAFETY AND POLLUTION CONTROL

U. S. Geological Survey

Members:

A. Dewey Acuff
J. R. Balsley
Henry W. Coulter
B. F. Grossling
Hubert Risser
W. A. Radlinski, Chairman

May 1973

Abbreviations Used In The Report

AEC - Atomic Energy Commission

ANSI - American National Standards Institute

API - American Petroleum Institute

ASME - American Society of Mechanical Engineers

ASTM - American Society for Testing and Materials

EPA - Environmental Protection Agency

FAA - Federal Aviation Agency

LMS - Lease Management Study (conducted by a team of systems analysts from the U.S. Geological Survey)

NAE - National Academy of Engineering (specifically a panel of the Marine Board who conducted a study of OCS safety)

NASA - National Aeronautics and Space Administration (specifically the team of NASA analysts who conducted a study of OCS operations)

NOAA - National Oceanic and Atmospheric Administration

OCS - Outer Continental Shelf

OOC - Offshore Operators Committee (Gulf of Mexico)

USCG - United States Coast Guard

USGS - United States Geological Survey

WOGA - Western Oil and Gas Association

Foreword

The Director, U.S. Geological Survey (USGS) appointed a Work Group to review the findings of three studies conducted at the request of the USGS on improving safety and pollution control in the management of Outer Continental Shelf oil and gas operations, and to recommend appropriate implementation actions. The studies are identified in the Appendix.

This report is not only responsive to the specific recommendations of the studies, but also reflects findings from meetings with personnel from the American Petroleum Institute, the Offshore Operators Committee, the Western Oil and Gas Association, a panel of the Marine Board, National Academy of Engineering, NASA, Occupational Safety and Health Administration, the Department's Office of the Solicitor, and others.

Several actions have already been taken where an immediate response was considered necessary or desirable. For example:

- o Contracts studies have been made to determine requirements for implementation of systems analysis reviews.
- o The Marine Board, National Academy of Engineering, has agreed to establish a Review Committee on Safety of OCS Petroleum Operations.
- o Action was initiated to expand OCS Accident Investigation Procedures to include an immediate notification, after the occurrence of an accident, to all OCS lessees and operators of potentially hazardous situations (Safety Alert).
- o The Environmental Protection Agency, the National Oceanic and Atmospheric Administration, and the U.S. Coast Guard have been requested to participate in the implementation of appropriate recommendations of the NAE study.
- o Opinions have been obtained from the Department of Justice and the Office of the Solicitor on the legal aspects of certain implementation actions.
- o Arrangements were made for API cooperation in the implementation of those recommendations calling for its participation.
- o Safety committees have been established in the Offshore Operators Committee and the Western Oil and Gas Association.

Similarly, the Conservation Division of the U.S. Geological Survey, which has the regulatory responsibility for OCS activities, has already responded to various recommendations as a result of direct discussions the Work Group has had with them during the course of the study. For example, inspection procedures developed in the Lease Management Study have been implemented.

The report is organized in sections by subject. Each section contains the related recommendations from the three study reports, some remarks, the Work Group's recommendation, and finally the implementation action required.

1. FAILURE REPORTING AND CORRECTIVE ACTION

RECOMMENDATIONS OF STUDIES

NASA--*It is therefore recommended that USGS lay the groundwork for the type of activity, described above (a closed-loop, failure reporting and corrective-action program), in the drilling and production phase of the oil industry by requiring monthly summaries from each operator of failure causes and corrective action taken for all safety equipment specified by OCS Orders. All accidents and oil spills should follow similar procedures. For the procedure to be effective, its object should be recurrence prevention, with emphasis placed on the determination of causes, preventive action, and follow-up.*

This recommendation, if adopted, will have a significant impact, primarily due to the change in policy made necessary by the majority of offshore operators. The statement is often made by offshore people that "the only real test of equipment is to place it in service in the Gulf".

Whether this is a valid assumption or not, the data from this "test" should be utilized to maximum advantage. The basic philosophy to be followed is that every failure has a cause, every cause can be understood, and every failure can be corrected or alternate procedures provided.

REMARKS

In order to promote technological improvements in equipment necessary for safe offshore operations, and to reduce the occurrence of equipment malfunctioning, all operators should develop a systematized method for failure identification. In many cases, malfunctioning equipment has been replaced or repaired with little or no attempt made to determine the reason for failure. Consequently, a piece of equipment with an inherent failure problem might continue to be used and replaced for a period of time before the reason for continual failure is discovered. In conjunction with an analysis of failures, a corrective action program is necessary to guard against a recurrence of the same type of failure. Implementation of NASA's recommendation would tend to encourage operators to work more closely with their suppliers to determine and remedy causes of equipment failures. Analysis of accidents and oil spills would help to identify items for closer inspection and to determine patterns of equipment failure.

OCS Order No. 5, revised effective June 5, 1972, requires a quarterly failure analysis report for subsurface safety devices. Initial experience with this system should indicate the most favorable manner in which to proceed with failure reporting on other equipment.

WORK GROUP RECOMMENDATION NO. 1

It is recommended that the USGS require all operators to establish an internal failure-reporting, corrective-action program, to include: 1) an operator's report to the USGS on incidents, problems, and failures which result in fires or reportable oil spills or reportable accidents; 2) the factual circumstances surrounding the incident; and 3) the corrective actions taken. The operator's report to the USGS should be required on a scheduled basis. Data from the reports should be computerized to facilitate analyses and corrective actions. Implementation of this recommendation should not preclude compliance with the existing requirements for immediate reporting of serious accidents, all fires, and spills as specified in 30 CFR 250.43 and 250.45, and pertinent OCS Orders.

IMPLEMENTATION ACTION REQUIRED

The Conservation Division should determine the requirements for reporting and include them in OCS Orders. For those cases where the OCS Orders cannot be issued within a reasonable period of time, notices, as appropriate, should be issued to all operators.

2. ACCIDENT INVESTIGATION AND REPORTING

RECOMMENDATIONS OF STUDIES

NAE --The official reports stemming from investigation of major accidents should receive prompt and full public disclosure, and should be available in a readily accessible form.

The U. S. Government should directly sponsor, encourage, and provide the means for a public exchange of information on the causes and effects of accidents, and on the performance of specific items of safety-related equipment in the offshore industry.

A careful analysis should be carried out after every major offshore oil spill to determine the precise manner in which the spill occurred -- taking into account any equipment failures, personnel errors, or design inadequacies, their causes and what can be done to prevent such future occurrences.

The information resulting from accident investigation and evaluation of component performance should be analyzed by a competent organization (similar to the National Transportation Safety Board or the Marine Safety Council), and its conclusions should be made public promptly.

REMARKS

The Conservation Division established, on April 12, 1971, a procedure for "Notification and Investigation of Accidents". This procedure is designed to provide prompt investigation and systematic review of accidents as a basis for taking immediate corrective actions to limit the probability of recurrence. No provision is made, however, for public disclosure of findings such as is practiced by the U.S. Coast Guard and the Federal Aviation Agency. Publication of accident investigation results is desirable to develop public confidence in, and acceptance of, petroleum operations offshore.

The Assistant Solicitor in his memorandum of January 10, 1973, to the USGS stated that, "...there does not seem to be any legal objection to the publication of such reports. However, it is necessary to be careful about the content of the report published. For example, any proprietary information should be deleted before publication. Moreover, the report should be limited to factual statements and should not include judgments on the conduct of companies or personnel. The Geological Survey should consult the Solicitor's Office before publishing any reports".

WORK GROUP RECOMMENDATION NO. 2

The Work Group agrees with all four recommendations of the NAE Study, i.e.:

- a. Reports of major accidents stemming from the current USGS procedure for investigation of accidents should be made available to the public promptly.
- b. Work Group Recommendation No. 3, calling for a system for disseminating information concerning equipment failures and accidents, should include a means for the public to have access to the information.
- c. Analyses of causes of major oil spills should be made as part of the accident investigation procedure and, if required, by additional follow-up studies. Results of all such analyses should be provided to the Review Committee (see Work Group Recommendation No. 15).
- d. Results of accident investigations, in addition to being made available to the public, should be provided to the Review Committee for possible further analyses.

IMPLEMENTATION ACTION REQUIRED

The Conservation Division should begin immediately to implement the above recommendations. They will need to determine the format and means of disseminating reports to the public and consult with the Solicitor's Office prior to release.

Referral of appropriate items to the Review Committee should be done by the Director, USGS.

3. INFORMATION EXCHANGE

RECOMMENDATIONS OF STUDIES

NASA--It is recommended that the USGS investigate the legal question of a possible anti-trust law violation regarding formal exchange of hardware and method problem information within the oil and gas industry. If a favorable ruling is obtained, USGS should encourage and participate in the development and operation of the system.

As an alternative, USGS could become the focal point for this information and disseminate it to all concerned parties.

NAE --In addition to, and separate from the inspection procedures, there should be a government-sponsored system of reporting safety-related information for the purpose of improving the safety of offshore operations and the inspection system by additions and eliminations. This system, in order to be effective, must take into consideration and allow for the problems of self-incrimination.

REMARKS

To utilize fully the information gathered through a failure and accident reporting and corrective action program, it will be necessary to disseminate such information throughout the offshore petroleum industry. NASA has noted that it has been successful in providing a rapid exchange of information in the space program which has been one of the keys to its success. The Atomic Energy Commission also employs procedures to notify all AEC installations of accidents, their causes, and remedial actions to prevent recurrences.

WORK GROUP RECOMMENDATION NO. 3

The USGS should establish and operate a system for disseminating information concerning equipment failures and accidents, utilizing data obtained through a failure and accident reporting and corrective action program, operator reports, and investigations conducted by the USGS. Such information should be made readily available to the public.

A system should also be established for immediate notification to all operators of a potential failure or accident as a result of specific incidents, prior to a full investigation and final dissemination of information.

IMPLEMENTATION ACTION REQUIRED

In view of the mass of data to be handled, and the intricacies of a system for evaluating, cataloging, and dissemination of information, the USGS should contract for the design by data-bank specialists. Due consideration should be given to the possible adaptation to USGS needs of dissemination systems used by other agencies such as NASA, AEC, FAA, and others.

A "Safety Alert" system for immediate notification to all operators of failures and accidents has already been implemented.

4. RESEARCH AND DEVELOPMENT

RECOMMENDATIONS OF STUDIES

NASA--It is recommended that USGS establish a method to determine needs and conduct or direct the research, testing and development necessary to improve equipment and methods for an increasingly safe and pollution-free operation on the OCS.

An alternate recommendation is that USGS work with the industry in establishing an organization such as the American Petroleum Institute (API) to serve as the R&D focal point, with all companies contributing toward resolution of problems.

NAE --The U. S. Government should encourage and utilize industry research and development programs by means of promotion of industry consensus standards on offshore technology so that it can act to ensure that information on improvements in safety technologies becomes available to participants in offshore resource development.

The U. S. Government should sponsor a coordinated program to specify reasonable limits of crude oil intrusion in accordance with biological and aesthetic standards. These standards should be set in a manner that will take full account of site variables. The effort should be carried out on a continuing basis in order to take advantage of improvements in the technology of offshore petroleum operations. The program should be specifically directed to provide a basis for engineering design and standards for components and systems to be used in offshore petroleum operations.

The U. S. Government should make quantitative studies of the effectiveness of the various present and potential methods of cleaning up oil from the marine environment, and of their potential marine environmental impact.

The U. S. Government should actively encourage and sponsor the development and testing of damage-limiting and fail-safe systems and techniques in the areas of damage control, fire-fighting, and well control.

REMARKS

Considerable research has been conducted by various segments of the petroleum industry and by certain governmental agencies in matters related to offshore

drilling and producing operations. In the past, however, development of additional safety controls by the industry often resulted only as a side effect from the main thrust of its research efforts. NASA has noted that individual companies have R&D programs devoted primarily to improving production capability with some effort to improve safety and anti-pollution equipment and methods included.

The Solicitor's Office has advised that there is legal authority to enter contracts for scientific or technological research into any aspect of problems related to Interior Department programs (42 USC § 1900), but there is no authority to require OCS operators to conduct R&D. They further advise that a joint Government-Industry R&D program would be a possibility, but would be more complex than a program operated by the USGS alone.

WORK GROUP RECOMMENDATION NO. 4

- a. The USGS, in cooperation with the API, should establish a program to encourage and promote research and development in safety and anti-pollution equipment and systems. Current and completed research and development should be taken into account in the determination of specific needs. Such needs should be communicated to industry through API. For those needs where there is no response from industry, or the response is unsatisfactory, the USGS should contract for the required work. (See also Recommendation No. 8a.)
- b. With specific reference to the NAE recommendations, the Work Group recommends:
 - (1) The promotion of industry consensus standards should be effected through a cooperative arrangement with API (see Work Group Recommendation No. 5).
 - (2) Requests should be made to NOAA, USCG, and EPA to sponsor programs to study the effects of various amounts of crude oil intrusion into the marine environment, taking into account site variables.
 - (3) The recommendation to undertake quantitative studies of the effectiveness of methods for cleaning up oil from the marine environment should be referred to the U. S. Coast Guard.
 - (4) The development and testing of damage-limiting and fail-safe systems in the area of damage control, fire-fighting, and well control should be an item for follow-up under the cooperative arrangement with API.

IMPLEMENTATION ACTION REQUIRED

Arrangements have been made with API for the recommended cooperative effort and the desired programs are underway with personnel from the Conservation Division participating.

EPA, NOAA, and the USCG have been requested to respond to the NAE recommendations. Their replies were favorable and pointed out the various pertinent activities in which they are already engaged.

5. STANDARDS AND SPECIFICATIONS

RECOMMENDATIONS OF STUDIES

NASA--That USGS seek API cooperation in establishing a committee to function under USGS guidance for the purpose of determining specific needs, and to write, review and approve standards/specifications for safety and anti-pollution equipment. The committee must function under the guidance of USGS.

That specifications developed by the committee contain requirements for a basic quality control system and, where equipment is to be used in a deleterious environment, an environmental test program. The committee should use, as a quality system guideline, the quality control provisions of the Bureau of Mines specification covering fuses for trailing cables used in coal mines, and in NASA Publication NPC 200-3, "Inspection System Provisions for Suppliers of Space Materials, Parts, Components and Services".

That the USGS, through OCS Orders, require the use of approved standards/specifications.

As an alternate recommendation, if the USGS cannot obtain API participation, it is recommended that USGS establish a committee, comprised of appropriate members from the industry, for the purpose of developing these standards/specifications for equipment and methods used in OCS operations.

NAE --The U.S. Government should encourage and support the development of a comprehensive system of industry consensus standards and should make use of the resulting standards system in the regulation and inspection of the offshore industry, and make adherence to such standards a consideration in the issuance of permits.

The American National Standards Institute (ANSI) should be used jointly by government and industry to integrate the efforts of government, industry, and the professional societies for the development of industry consensus standards for personnel, equipment, and operating procedures.

U. S. Government personnel associated with offshore resource development should participate in the standards preparation procedures and there should be means of assuring that such government personnel can participate as equals.

Industry and the U. S. Government should establish a working relationship for the joint development of standards for advanced deep water technology. Industry consensus standards for completion and workover safety procedures should be developed. Special consideration should be given hazard control and damage limiting methods.

The U. S. Government should develop a policy regarding the testing of offshore equipment, including the establishment of criteria for selection of test sites for such equipment in the marine environment.

REMARKS

NASA has noted the need for the development of new and more meaningful standards. It was also noted that many standards had been written in too general terms, insufficient to adequately describe a specific situation. Although equipment quality is of the utmost concern to oil operators, no requirements have been placed on manufacturers for a quality control system. Organizations already in existence, such as the American National Standards Institute, American Petroleum Institute, American Society for Testing Materials, American Society of Mechanical Engineers, etc., are best qualified to develop the necessary standards.

WORK GROUP RECOMMENDATION NO. 5

The USGS, in cooperation with API, should identify needs for additional or more specific standards for safety and anti-pollution equipment. The standards should include performance requirements for the operational testing of the equipment in the marine environment. Arrangements should be made with ANSI for the development of needed standards. API, ASTM, ASME, and other organizations should be requested to prepare proposed standards as appropriate, with USGS participation. Standards adopted by the USGS should be published and incorporated in OCS Orders. (See also Work Group Recommendation No. 4.)

IMPLEMENTATION ACTION REQUIRED

Arrangements have been made with API for its cooperation. The program is underway with participation by personnel of the Conservation Division.

6. SYSTEMS ANALYSIS^{1/}

RECOMMENDATIONS OF STUDIES

- NASA--1. The team recommends that USGS request identification of operations and equipment critical to safety of personnel and pollution prevention. Data to complete this "Critical Items List" could be derived from two sources. One, from compilation of accident history and problem/failure reports, is the topic of another recommendation. The second source could result from analysis of the systems utilized to perform a given function. Two types of design/system analysis most commonly used in industry today are the Failure Mode, Effect Analysis (FMEA) and the Hazard Analysis (HA).
2. The USGS Gulf Coast Regional Office should be authorized to implement the proposed "design review" group.
 3. The region should require submission from offshore operators a list of critical operations to be performed during drilling at time of permit request. List of critical systems should also be obtained at the time of well completion, and appropriate reviews conducted with the operator.
 4. The requirement for submission of complete Hazard Analysis should be phased into system starting with new work, with time limits on existing wells.
 5. The analysis group should work with operators to eliminate (reduce) hazardous operations by recommending redesign of hardware or operations.
 6. Inspection criteria should be revised to include any additional critical equipment identified by Hazard Analysis.
- LMS --1. Systematic procedures should be established to identify potential hazards associated with various OCS operations and provide risk assessments.
2. Design specifications for a safety program to be implemented by industry as a means of further reducing risk of accidents and losses on the OCS. The specifications should emphasize (1) the early identification of hazards, preferably in the

^{1/} "Hazards Analysis" is the term used in the NASA report. "Systems Analysis" is substituted herein because it is broader and more descriptive of what actually is desired in the Work Group's recommendation.

design or planning stage of an operation and (2) the explicit statement of assumed risks and losses associated with the operation. Such statements and hazard analyses should eventually be part of applications for new platforms and associated production equipment. As part of the first phase of the safety program, each operator should be required to submit a general safety plan following Survey-defined specifications.

REMARKS

In order to evaluate Hazards Analysis and Failure Mode and Effects Analysis procedures more fully, the USGS contracted for such analyses of actual offshore drilling and producing operations. Two separate contracts were completed, one by the General Electric Corporation and the other with the Southwest Research Institute. The results are now being studied.

WORK GROUP RECOMMENDATION NO. 6

The USGS should require lessees to submit a systems analysis prior to granting approval for platforms, pipelines, drilling operations, and production operations. Operators should provide with each analysis, an identification of operations and equipment critical to safety of personnel and pollution prevention. The latter information should be incorporated into a "Critical Items List". A phased program requiring systems analysis on existing platforms and pipelines should also be developed.

IMPLEMENTATION ACTION REQUIRED

Implementation of the recommendation will require study of the findings of the recently completed contracts for hazards analysis. Assuming satisfactory results, the requirements for systems analysis should be incorporated in OCS Orders and the necessary staffing for review of analyses should be developed by the Conservation Division. The reorganization of the Conservation Division provides for an operational unit to accomplish this work.

7. ENGINEERING DOCUMENTATION

RECOMMENDATIONS OF STUDIES

NASA--It is recommended that USGS require that certain minimum engineering documentation be available at the operator's lowest level onshore engineering office. This recommendation is made in pursuit of the preceding recommendation and others contained in this report, as well as the USGS stated objectives of reviewing process equipment designs more closely. The following list is recommended as minimum requirements:

1. Structural layout and details.
2. Piping runs.
3. Schematic diagrams (mechanical and electrical).
4. Engineering parts list (complete to valve and power supply level, including part number, name and manufacturer).
5. Specifications for all actively functioning components.

REMARKS

The engineering documentation of some platform systems is incomplete, and where such documentation exists, it is not always readily available to operating personnel. The availability of complete documentation at the working level is essential for immediate analysis of problems or malfunctions that could lead to accidents.

WORK GROUP RECOMMENDATION NO. 7

OCS Orders should include requirements for certain minimum engineering documentation such as wiring diagrams, structural layouts, piping layouts, etc., to be readily available at the operator's lowest level onshore engineering office, with copies to the USGS. A Conservation Division task force should identify which documentation is required.

IMPLEMENTATION ACTION REQUIRED

The Conservation Division should organize a task force to identify the required documentation, consult with operator groups to determine that particular items can be provided meaningfully, and include appropriate requirements in OCS Orders.

8. WEAROUT PREVENTION

RECOMMENDATIONS OF STUDIES

- NASA--1. Development of a reliable sand erosion probe under USGS sponsorship (including a specification).
2. USGS revision of OCS No. 8 specifying method of implementation of sand erosion probe.
 3. Requirement for rigorous test and inspection (X-Ray/sonic) of wells upon sand detection.

At a later date, when data on failed equipment are available, an evaluation of the necessary inspection frequency and/or periodic replacement of selected safety equipment should be undertaken.

REMARKS

Sand erosion is a major cause of failure of safety equipment on wells producing sand. Although some research toward development of reliable sand erosion detectors is underway, this effort should be accelerated.

WORK GROUP RECOMMENDATION NO. 8

- a. Include the development of a reliable sand erosion detector in the research and development program (see Recommendation No. 4).
- b. Develop rigorous test and inspection procedures for detection and control of sand erosion (see Recommendation No. 12).
- c. Using data from a failure reporting and corrective action system and other sources, specify the requirements for the frequency of inspection and the frequency of replacement for equipment susceptible to failure, and include them in OCS Orders.

IMPLEMENTATION ACTION REQUIRED

The Conservation Division should incorporate the requirement of Recommendation No. 8a in the Research and Development program, and those of Recommendation No. 8b and No. 8c in its Inspection Procedures program. OCS Orders should be revised accordingly.

9. TRAINING AND CERTIFICATION

RECOMMENDATIONS OF STUDIES

NASA--It is recommended that USGS require, through revision or addition of OCS Orders, that:

1. Operators develop methods to ensure that company or contract personnel performing inspection and test of safety or anti-pollution equipment are properly trained in USGS requirements, the equipment functions, test methods, etc., prior to performing these services and that training is periodically updated as equipment is modified or new types of equipment are utilized. Operator or outside-source certification of personnel following demonstration of skill should be required.
2. Operators provide USGS with a description of the methods to be employed in accomplishing the above, and that these methods be approved in advance by USGS.

NAE --Since operator training programs are essential to safety in offshore resource development, the U. S. Government should:

Actively encourage and support such training programs; including the objective of safe and reliable operation, installation, maintenance, and repair of equipment systems and components;

Sponsor industry-government standardization of training criteria;

Give weighted consideration to the existence and quality of job qualification requirements and corresponding personnel training in permit procedures;

Ensure the participation of U. S. Government personnel involved in standard setting, regulation and inspection or permit procedures in such training programs.

REMARKS

A considerable amount of vocational training and some safety training is already accomplished under the auspices of the Committee on Vocational Training of the Division of Production of API through courses given in various colleges and universities in the Gulf Coast area. The International Association of Drilling Contractors also trains drilling personnel, and a considerable amount of training is accomplished by the individual companies.

A Solicitor's opinion on legal authority for the USGS to require operators by regulation or OCS Order to develop and submit for approval programs for the training and certification of company personnel was answered on April 27, 1972, as follows: "In order to implement such a program, it is our opinion that Geological Survey must first set standards to be met by the companies for training and certification of personnel in safety and pollution control. Any course of study or training program sufficient to meet these standards should then be approved by Geological Survey. Companies should be free to establish their own training programs or send their personnel to an approved course".

WORK GROUP RECOMMENDATION NO. 9

a. The USGS, working with industry through API, should set standards and requirements for training of personnel, to include, but not be limited to, the following:

(1) A requirement for minimum training in safety and pollution prevention and control for all company and contractor personnel, including identification and proper use of safety equipment, emergency procedures, and first aid.

(2) A requirement that appropriate company and contractor field personnel be briefed on USGS regulations and orders.

Standards and requirements for such training should be specified in OCS Orders and a certification of compliance should become a prerequisite for certain permits and operational work. Appropriate credit should be given for pertinent experience.

b. USGS field supervisory personnel and inspectors should be required to participate in training courses appropriate to their responsibilities.

IMPLEMENTATION ACTION REQUIRED

Arrangement have been made with API for a joint effort to develop the necessary standards and specifications for training of industry personnel. The Conservation Division should pursue this effort and revise OCS Orders accordingly.

Requirements for appropriate training of USGS personnel should be included in the Division Manual.

The Conservation Division should arrange for briefing programs on USGS regulations and orders.

10. MOTIVATION PROGRAM

RECOMMENDATIONS OF STUDIES

NASA--It is recommended that USGS initiate an OCS-wide safety and anti-pollution motivation program. Such a program could be effective in terms of obtaining industry response and favorable publicity.

A program consisting of at least the following elements is suggested.

1. Visual aid package consisting of dramatic evidence of the results of carelessness and human error (pictures of platform fires, etc.) accompanied by analysis of typical events leading to accidents and pollution.
2. Periodic review of accident (safety and pollution) records, from available statistics, with appropriate awards for top performance. The awards should be public ceremonies with maximum possible publicity.

The government program could be put together by an outside company specializing in the field, but should be conducted by USGS.

Additional elements recommended to be implemented by off-shore operating companies, with some USGS participation, are:

Safety training for all field personnel to include identification and proper use of all safety equipment. Review of all emergency procedures with periodic drills. Instructions concerning daily operations to avoid pollution and minimize hazards.

Periodic review of accident and pollution history to field employee level with recognition for good performance. Recognition would assist in obtaining cooperation for better reports of incidents.

Employee suggestion program regarding safety improvements for both equipment and operations. Again, a recognition system is recommended for accepted suggestions.

REMARKS

The Work Group feels that safety and anti-pollution motivation programs would be more effective if sponsored by industry, albeit the USGS should encourage such programs and participate as appropriate.

WORK GROUP RECOMMENDATION NO. 10

The USGS should ask API to take the lead in promoting safety and anti-pollution motivation programs for all personnel involved in offshore operations. API should be encouraged to obtain descriptions of the various motivation ideas and programs now practiced by several companies and publish the best in a brochure for others to consider for adoption.

IMPLEMENTATION ACTION REQUIRED

Arrangements have been made with API to assume leadership in motivation programs, encourage such programs throughout industry, and participate where appropriate. The Conservation Division should assist API in this effort.

11. LEASE MANAGEMENT PROGRAM

RECOMMENDATIONS OF STUDIES

NASA--It is recommended that USGS regional office extend the current effort by staffing, at the earliest possible time, with personnel experienced in quality management and capable of developing, documenting and assisting the Regional Supervisor in implementing this type program. As a minimum, this program should contain the following information:

1. An organization chart
2. Functional statement for each section, district and unit
3. List of reports required of each section, district, and unit
4. Personnel training records
5. Detailed procedures outlining the functions to be performed by USGS personnel at both the district and regional levels
6. Assignment and frequency of inspection functions
7. List depicting areas to be controlled in performing inspection functions
8. Guideline procedures covering inspection and/or tests to be witnessed by USGS district personnel
9. Waiver/departure procedure

It is recommended that NASA documents NPC 200-1A, "Quality Assurance Provisions for Government Agencies", and NHB 5330.7, "Management of Government Quality Assurance Functions for Supplier Operations", be used as guidelines.

USGS should require that all data generated from this planned quality effort be assembled at the regional and Washington offices to be analyzed and evaluated to determine the effectiveness of the district operations.

LMS --The major elements of the OCS Lease Management Program, the Production Program and the Revenue Program need to be coordinated and directed to avoid conflicts over available resources.

1. Designate an OCS Lease Management Program Coordinator.
2. The Survey should hold a formal annual review of the performance of the program components.
3. Survey management should delineate specific operational policies for both programs.
4. The Survey should encourage personnel, especially field technicians, to participate in industry training programs.
5. A paperwork management study should be conducted in order to streamline procedures for processing documents related to oil and gas operations.
6. All routine procedures, decision rules, policies, and operating criteria pertaining to OCS operations should be documented in a set of Branch of Oil and Gas Operations' Manuals.

REMARKS

Staffing for quality control management capability as recommended by NASA should be provided. These functions can and should be performed by the Operations Analysis Unit in the Conservation Division's Metairie Office when it is adequately staffed. This Unit as presently constituted includes groups with accident investigation, design review, orders and field rules, and pollution control functions.

The activities at the field level involved in the OCS lease management program are so diversified and time consuming that adequate means of coordinating them is essential. These functions, however, are the assigned responsibility of the Manager, the Supervisor, his Deputy, and the heads of the Sections, Units, and Groups now existing within the organizational structure. The Supervisor and his Deputy have the direct overall responsibility for coordination of the entire program and under a proper line-staff organizational structure it would not be

appropriate to delegate this responsibility to a "Program Coordinator". Additionally, the coordination of all activities should improve when the positions under the Conservation Division reorganization plan are filled and fully operational. However, if assistance in coordinating program activities is needed, such assistance should be added to the staff.

Also, the Division's reorganization plan, when fully implemented, should provide adequate coordination of the Lease Management Program at the Division headquarters level.

WORK GROUP RECOMMENDATION NO. 11

- a. The NASA recommendations listed above should be implemented to provide the needed quality management capability. Most of the items given as a minimum for the program plan are in existence, but they need to be reviewed, updated, consolidated, and systematically documented.
- b. The LMS recommendations listed above should also be implemented, with the exception of item 1. Instead of an OCS Lease Management Program Coordinator, necessary staff capability should be added for program coordination.

IMPLEMENTATION ACTION REQUIRED

The Conservation Division should add personnel to implement these recommendations.

The Director's Office should develop the guidelines for a formal annual review and prepare the recommended operational policies.

A contract will probably be required for the paperwork management study.

The recommended operations manuals should be developed by the Conservation Division as soon as possible.

12. INSPECTION PROCEDURES

RECOMMENDATIONS OF STUDIES

- NASA--a. The data processing equipment, that the team (LMS study team) was advised is being considered for location in the Regional Office, should be installed at the earliest possible time.
- b. The presently used Potential Incidence of Non-Compliance (PINC) list should be modified to separate the gathering of descriptive information (e.g., number of wells/platforms) from compliance information (e.g., satisfactory operation of check valves).
 - c. A method should be established to ensure that compliance characteristics of the PINC list are maintained current as OCS Orders are revised or added.
 - d. Conservation Division should devise a "best method" of adapting study techniques to the needs of Region operations. An operating procedure should then be developed, and implemented as soon as possible, in order to provide uniform guidance to all concerned personnel. The procedure should include the use to be made of information generated by District, Region, and Headquarters.
 - e. The procedures referenced above should be integrated into the overall OCS Management Program Plan.
- LMS --1. Adopt the inspection techniques and methodology developed and utilized in the course of this study.
- 2. Expand the scope of the inspections to include other production operations as they are specified in conjunction with the hazard review activity and as new OCS Orders are written.
 - 3. Continue the review and analysis of inspection results in order--
 - a. to modify inspection strategies and to allocate resources in response to changes in the level of company activity and compliance;

- b. to advise the Offshore Operators Subcommittee on Safety of the inspection results.
4. Augment the existing enforcement authority with the addition of required fixed periods of shut-in time for specific items of noncompliance or combinations of items.
5. On a periodic basis, perhaps monthly, inform upper management of actions taken against their company.

NAE --Routine inspection procedures in the offshore industry should be carried out by the specific companies involved for compliance with industry consensus standards. U. S. Government inspections should be confined to spot-checking to ascertain compliance to regulations.

REMARKS

USGS inspection procedures have been criticized for lack of uniformity among inspectors in the interpretation and application of OCS Orders. It is important that uniform practices be adopted.

LMS Recommendation 4 advocates that required fixed periods of shut-in time for specific items of noncompliance or combinations of items be added to existing enforcement authority. In response to an inquiry the Solicitor's Office stated, "The question to be asked is whether a particular regulation is designed to punish or whether it is germane to the regulatory function.... Thus, a period of shut-in which is necessary to carry out a legitimate regulatory function is permissible; however, if it is designed strictly for punishment it is not permissible, and new legislation would be required".

While it might be argued that such a shut-in would be designed as a deterrent to a recurrence of the violation, it is difficult to consider the shut-in itself anything other than a punitive action.

A further aspect is that while such a shut-in might punish the company by a temporary loss or deferment of income, the public would, likewise, have a deferment of royalty income and would suffer a loss of availability of fuel.

WORK GROUP RECOMMENDATION NO. 12

- a. The USGS should incorporate into its inspection program all of the NASA recommendations (a. through e. above) and LMS recommendations 1, 2, 3, and 5 above. Punitive fixed-period shut-ins (LMS

recommendation 4 above) are not permissible under existing legislation, nor are they considered advisable.

- b. OCS Orders should include requirements for lessees to conduct inspections on a scheduled basis and report the results in a specified format to the USGS.
- c. The USGS should explore the feasibility of third-party inspections as an alternative or supplement to lessee inspections.
- d. The PINC system of inspection should be periodically reviewed to determine how it can be modified and improved.
- e. The USGS should formalize inspection strategies and policies, including optimum frequencies of inspections, and emphasize improvement of methods for evaluating inspection results.
- f. The USGS should continue to evaluate procedure for inspection and enforcement to insure the application of rigorous and uniform practices in light of new requirements and past experiences.

IMPLEMENTATION ACTION REQUIRED

While some of the recommendations have already been implemented, the Conservation Division should take the necessary steps to require standardized inspections by lessees.

They should also determine the feasibility of third-party inspections and recommend to the Director appropriate follow-up actions.

Systematic review by the Conservation Division of inspection methods and strategies should be continued. Procedures should be developed for rigorous and uniform application. Inspectors should be instructed accordingly.

Attainable inspection frequency schedules should be developed. Wherein these are less than the optimum, requirements for additional required capacity should be identified.

13. OCS ORDER DEVELOPMENT

RECOMMENDATIONS OF STUDIES

NASA--In order to remain abreast of the ever-changing needs, the following recommendation is made: The USGS Regional Office should organize an OCS Order development and implementation function. This function, technical in nature, involves many hours of research, investigation, and discussion, and should be assigned to a small committee of qualified people selected by the Supervisor. This committee should:

1. Schedule meetings periodically to review current needs and evaluate existing Orders.
2. Meet with USGS Region management to determine their overall reaction to the proposed order and/or change.
3. Schedule meetings with the Offshore Operators Committee and/or subcommittee and discuss the change and the impact it will have on the operators and other companies operating in the OCS and document their comments and/or suggestions.
4. Schedule meetings with the USGS District engineers and chief technicians, discuss the proposed changes and document their comments.
5. If needed, consult with or solicit advice from field officials of other Government agencies and document their comments.
6. Assemble and consolidate the comments into a report for USGS Region management review and evaluation.
7. Coordinate for approval with the Washington level.
8. After the new Order and/or change has been agreed to by all concerned, develop the final draft to submit to Washington for signature.
9. After the Order is approved, serve in an advisory and assistance capacity to USGS management in assuring that concerned USGS and operator personnel thoroughly understand requirements prior to implementation and during implementation.

NAE --In order to avoid inhibition of technical development and to take maximum advantage of advances made in equipment and methodology, the U. S. Government policy should be to establish regulations in terms of the objectives to be achieved and not in terms of specific methods of achieving them.

In permit procedures, there should be continuation and refinement of the current practice of requiring submission of plans of applicants in terms of equipment and including personnel qualification and training procedures which will be used to control hazards. The government should continue to make granting and continuance of permits contingent upon adherence to regulation and submitted plans.

Regulations established for the control of offshore oil operations should take into account on a continuing basis the results of the analysis recommended above*, as well as consideration of the natural environmental hazards (such as hurricanes, earthquakes, or large waves, and the state of the art of working in the marine environment).

REMARKS

The development of OCS Orders is of utmost importance in achieving and maintaining safety and pollution control in OCS operations. More formalized organization and procedures are needed to develop new orders and to revise existing orders as new and improved technology and operating procedures are developed.

WORK GROUP RECOMMENDATION NO. 13

- a. Formalized procedures of the type outlined in the NASA recommendation should be established for development and revision of OCS Orders.
- b. In general, OCS Orders should specify the objectives to be achieved, with standards for achievement included by reference.
- c. The Work Group agrees with the NAE recommendations that 1.) there should be continuation and refinement of the current practice of requiring submission of plans of applicants in terms of equipment and including personnel qualifications and training procedures; and 2.) that regulations should take into account on a continuing basis the results of the analysis of information resulting from accident evaluation, as well as consideration of natural environmental hazards.

* Information resulting from accident evaluation

IMPLEMENTATION ACTION REQUIRED

The Conservation Division should prepare written procedures outlining the step-by-step actions to be followed in the formulation of OCS Orders for all areas, in keeping with the NASA and NAE recommendations.

14. STANDARDIZATION OF FORMS

RECOMMENDATIONS OF STUDIES

NASA--It is recommended that the USGS revise the Pollution Report form, presently being utilized in the District offices, and require its use by the operators for those spills presently requiring written confirmation. The form should include as a minimum the following:

- a. More detailed information, especially in the area of cause and corrective action. For example, if equipment malfunction is the cause, the reason should be recorded in detail.
- b. The "corrective action taken" remarks should include, in detail, the repair, if any, that was accomplished to correct the immediate problem.
- c. Information should be provided as to action taken to prevent recurrence.

REMARKS

A revised Pollution Report form is needed to derive necessary information for corrective actions.

WORK GROUP RECOMMENDATION NO. 14

The Work Group agrees with the NASA recommendation above.

IMPLEMENTATION ACTION REQUIRED

The Conservation Division should revise the form and require its use.

15. SAFETY AND ADVISORY COMMITTEES

RECOMMENDATIONS OF STUDIES

- LMS --1. *Establish Offshore Operators Subcommittee on Safety-- Subcommittee and the Survey should periodically review the performance of the Safety Program and exchange information on potential hazards and review program specifications.*
2. *A hazard review committee should periodically review reports of accidents, unusual operating conditions, equipment malfunctions, and inspection results, assess the adequacy of the current OCS Orders, and recommend changes in regulations or procedures which would reduce risks of accidents and associated losses to both industry and government.*

OTHER--*The Director, USGS, recommended a review committee be established on safety of OCS petroleum operations to serve as an independent audit of the effectiveness of USGS operations and procedures.*

REMARKS

The recommended committees would serve to focus attention on safety and anti-pollution problems, and apply the collective expertise of several disciplines to provide solutions. A review committee would also serve as an independent audit of USGS OCS policies and operations.

As a result of the Work Group's suggestion, subcommittees on safety under the Offshore Operators Committee and the Western Oil and Gas Association have already been established. These subcommittees can 1.) review proposed changes or additions to orders and regulations, 2.) analyze industrial-type accidents that occur during drilling and producing operations, including pipeline operations, workovers, installing platforms, and related activities, 3.) collect statistics on industrial-type accidents and their causes, and 4.) promote and review the results of systems analyses.

After consideration of alternate ways to establish a review committee, arrangements were made for the committee to be established under the auspices of Marine Board, National Academy of Engineering.

It is expected to be established in July 1973 with the following objectives:

- o To provide advice on the policies and procedures of the USGS in fulfillment of its regulatory responsibilities for petroleum and gas operations in federal offshore areas related to safety, pollution control, and environmental protection.
- o Review, on an advisory basis, regulations, Outer Continental Shelf Orders, field rules, and the conduct of operations.
- o Prepare recommendations on the design of safety procedures and systems, and related programs.
- o When requested, review significant events and prepare recommendations for corrective measures.
- o To keep the public informed of its findings.

WORK GROUP RECOMMENDATION NO. 15

- a. Encourage the Offshore Operators Committee (OOC), as well as the Western Oil and Gas Association (WOGA), to establish a committee on safety. This committee can serve as a vehicle for communication between the operators and the Survey in discussions of general problems that arise.
- b. Establish a Systems Review Committee in each area with OCS operations, to be composed of key USGS field personnel. This committee should meet regularly to review accidents, unusual conditions, equipment failures, inspection results, and the adequacy of OCS Orders, and recommend appropriate changes in regulations, orders, and procedures. Reports of findings and recommendations should be submitted in writing to the Supervisor, with copies, through channels, to the Director, USGS.

IMPLEMENTATION ACTION REQUIRED

The Conservation Division should communicate with the safety committees of OOC and WOGA to maximize their effectiveness.

The Systems Review Committees should be established by the Conservation Division.

The Director, USGS, should propose items to the review committee for consideration. These would, of course, be additional to items which the committee would determine to consider on its own.

APPENDIX

Identification of Study Reports

1. "Applicability of NASA Contract Quality Management and Failure Mode Effect Analysis Procedures to the USGS Outer Continental Shelf Oil and Gas Lease Management Program," November 1971.

Members:

Morris K. Dyer, NASA	-- Marshall Space Flight Center
Dewey G. Little, NASA	-- Mississippi Test Facility
Earl G. Hoard, NASA	-- Marshall Space Flight Center
Alfred C. Taylor, NASA	-- Michoud Assembly Facility
Rayford Campbell, NASA	-- Michoud Assembly Facility

This report, prepared for the U.S. Geological Survey by a team of National Aeronautics and Space Administration specialists, examines the feasibility of applying to offshore oil and gas operations advanced engineering techniques designed to increase the reliability of safety and anti-pollution equipment, and includes several recommendations. The study period was three months.

2. "Outer Continental Shelf Lease Management Study," May 1972.

Members (USGS):

N. C. Matalas, Project Chief
E. R. Close
Thomas Maddock, III
D. W. Moody
H. E. Robinson
J. R. Slack
T. D. Steele

Part-time Consultants (USGS):

D. R. Dawdy
B. B. Jackson
I. C. James, II

This is a report of a study conducted by the Systems Laboratory Group, Water Resources Division, U.S. Geological Survey. The study was proposed by OMB and authorized by the Director, U.S. Geological Survey, in August 1970. The report describes Survey's Outer Continental Shelf Lease Management Program and sets forth recommendations for increasing the effectiveness of the program in achieving the objectives of safety and pollution prevention.

3. "Outer Continental Shelf Resource Development Safety: A Review of Technology and Regulation for the Systematic Minimization of Environmental Intrusion from Petroleum Products," December 1972.

Members (Panel of the Marine Board, NAE):

George F. Mechlin, Chairman	--	Westinghouse Electric Corp.
Claude R. Hocott	--	Esso Production Research Company
Bill J. Livesay	--	University of Tulsa
Richard C. Miller	--	Oceanographic Service, Inc.
J. Jamison Moore	--	Atlantis Scientific
William B. Rand	--	Submarex Corp. (Ret.)
Willard F. Searle, Jr.	--	Consulting Ocean Engineers (USN, Ret.)
Harvey J. Smith, Jr.	--	Lockheed Missiles and Space Co.

U.S. Government Liaison Representatives:

Keith B. Schumacher	--	U.S. Coast Guard
Eugene W. Standley	--	Department of the Interior

This is a report of a special study on operational safety in offshore resources development conducted by a panel of experts convened by the Marine Board, National Academy of Engineering, at the request of the Department of the Interior. The panel met in ten working sessions from May 1971 to August 1972. The report contains numerous recommendations.

ATTACHMENT E

GEOLOGIC TIME CHART

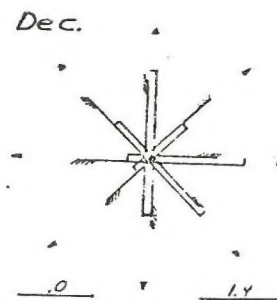
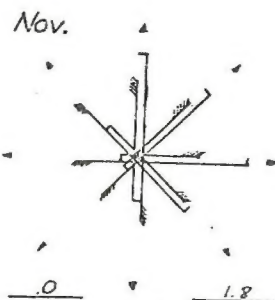
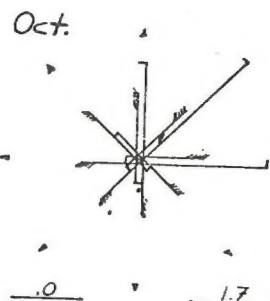
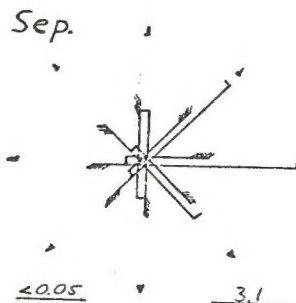
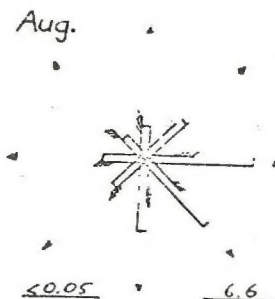
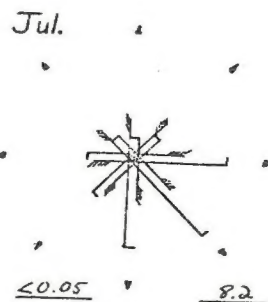
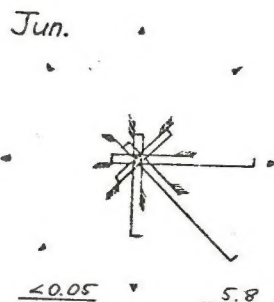
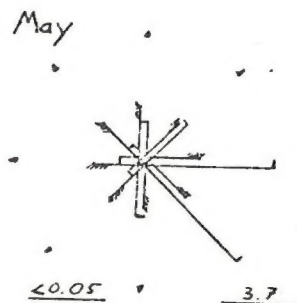
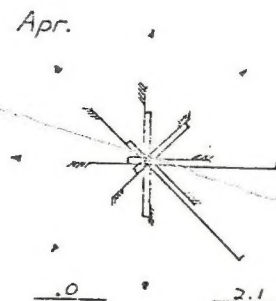
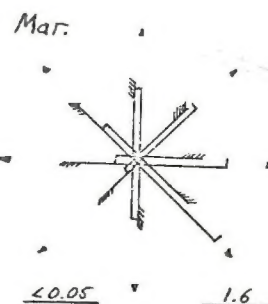
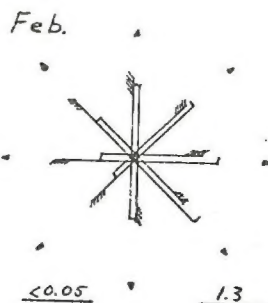
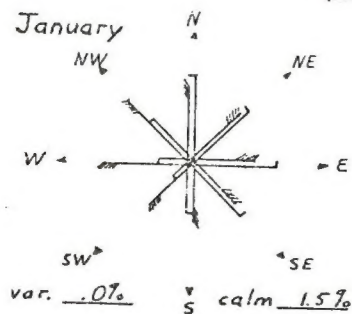
G E O L O G I C T I M E C H A R T

AGE DIVISIONS			TIME			
ERA	PERIOD		DURATION IN MILLIONS OF YEARS		BEGINNING MILLIONS OF YEARS AGO	
		EPOCH	E R A	PERIOD		
						EPOCH
CENOZOIC	QUATER - NARY	RECENT	63.011	1.011	0.011	0.011
		PLEISTOCENE		2	2	
	TERTIARY	PLIOCENE		62	12	13
		MIOCENE			12	25
		OLIGOCENE			11	36
		EOCENE			22	58
PALEOCENE	5	63				
MESOZOIC	CRETACEOUS		167	72	135	
	JURASSIC			46	181	
	TRIASSIC			49	230	
PALEOZOIC	PERMIAN		370	50	280	
	PENNSYLVANIAN			40	320	
	MISSISSIPPIAN			25	345	
	DEVONIAN			60	405	
	SILURIAN			20	425	
	ORDOVICIAN			75	500	
	CAMBRIAN			100	600	
PRE-CAMBRIAN	GRENVILLE OROGENY		4000		1000	
	OLDEST KNOWN ROCKS IN NORTH AMERICA				3200	
	OLDEST KNOWN ROCKS (MURMANSK AREA)				3400	
	PROBABLE AGE OF THE EARTH				4600	

ATTACHMENT F

Windroses portraying monthly wind patterns
over the Gulf of Mexico

Monthly wind patterns observed over the Gulf of Mexico in an area bounded by 27° N. to the coastline and 89°-92° W (New Orleans Locality)*



Legend:

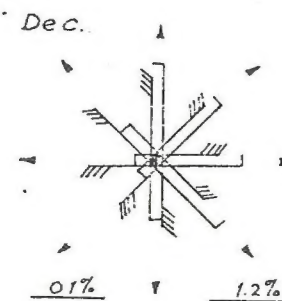
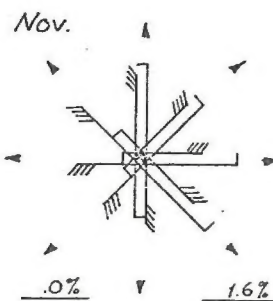
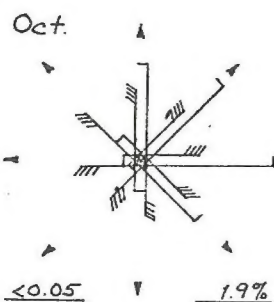
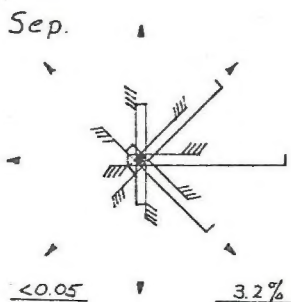
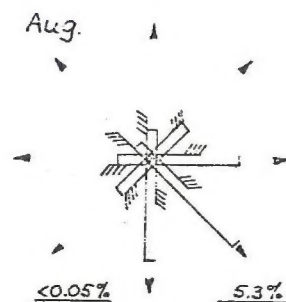
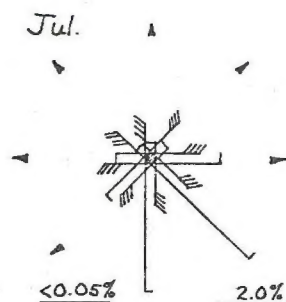
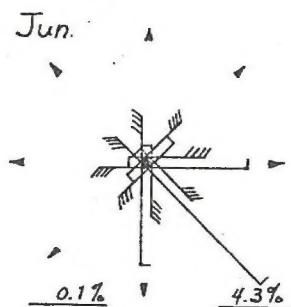
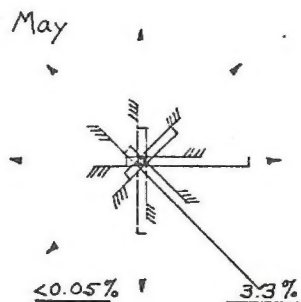
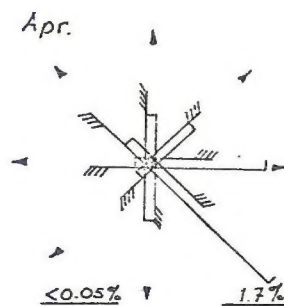
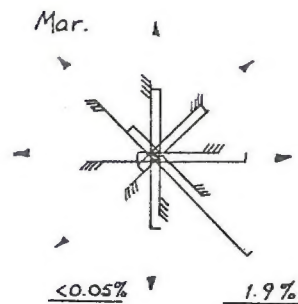
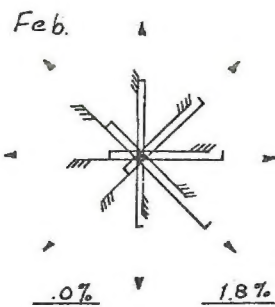
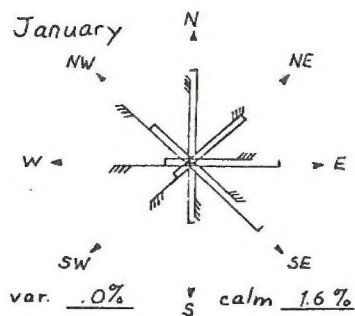
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mean speed, knots
pct. frequency

var = variable

* Data on this page based on 81,091 observations made over the years 1865-1968 from U.S. Naval Weather Service Command 1970, b.

Monthly wind patterns observed over the Gulf of Mexico in an
area bounded by 27° N. to the coastline and 92-95°W
(Galveston Locality)*



Legend:

Scale 0 5 10 15 20 25

mean speed, knots
pct. frequency

var = variable

Data on this page based on 49,392
observations made over the years
1884-1968 from U.S. Naval Weather
Service Command 1970, b.

Attachment G

Population, Employment, Personal Income, and
Earnings by Industry, Historical and Projected

BEA Economic Areas 138, 139, 140, 141

Attachment G

ECONOMIC AREA 138 - NEW ORLEANS, LA.

TABLE 1. POPULATION, EMPLOYMENT, PERSONAL INCOME, AND EARNINGS BY INDUSTRY, HISTORICAL AND PROJECTED, SELECTED YEARS, 1950 - 2020

	1950	1959	1962	1968	1969	1980	1990	2000	2010	2020
POPULATION, MIDYEAR	1,535,505	1,855,299	1,920,408	2,134,038	2,139,664	2,460,700	2,804,500	3,153,000	3,558,700	4,012,700
PER CAPITA INCOME (1967\$)	1,640	2,010	2,036	2,759	2,817	4,069	5,353	7,303	9,724	12,881
PER CAPITA INCOME RELATIVE (US=1.00)	.79	.82	.79	.84	.82	.85	.87	.88	.89	.90
TOTAL EMPLOYMENT	530,342	608,608	592,427			886,500	1,014,100	1,181,900	1,358,100	1,546,000
EMPLOYMENT/POPULATION RATIO	.35	.33	.31			.36	.36	.37	.38	.39
EARNINGS PER WORKER (1967\$)	3,771	4,896	5,213			8,816	11,483	14,998	19,485	25,625
EARNINGS PER WORKER RELATIVE (US=1.00)	.84	.91	.90			.94	.94	.95	.95	.96
IN THOUSANDS OF 1967 \$										
TOTAL PERSONAL INCOME	2,517,641	3,728,955	3,909,160	5,888,411	6,028,440	10,013,400	15,013,600	23,028,100	34,606,200	51,690,000
TOTAL EARNINGS	1,799,721	2,979,827	3,088,129	4,692,659	4,782,153	7,833,700	11,645,200	17,726,600	26,463,400	39,328,600
AGRICULTURE, FORESTRY & FISHERIES	142,599	93,975	89,128	119,575	101,936	124,500	141,400	168,900	219,700	292,600
AGRICULTURE	129,509	84,995	78,928	108,916	92,669	110,200	122,900	144,700	188,200	232,500
FORESTRY & FISHERIES	13,095	8,983	10,204	10,662	9,270	14,200	18,400	24,100	31,400	40,100
MINING	41,751	193,501	191,115	209,101	282,250	370,100	458,300	573,600	698,400	850,800
COAL	0	0	0	0	9	(5)	(5)	(5)	(5)	(5)
CRUDE PETROLEUM & NATURAL GAS	35,049	176,921	174,824	208,453	262,830	340,700	418,300	517,400	620,400	741,200
NONMETALLIC, EXCEPT FUELS	6,705	16,583	16,289	20,650	19,407	29,300	39,900	56,200	78,000	139,500
CONTRACT CONSTRUCTION	149,767	215,369	212,074	484,888	431,006	659,500	950,000	1,403,800	2,038,400	2,941,800
MANUFACTURING	420,611	605,612	619,031	944,061	966,704	1,523,000	2,223,600	3,347,000	4,974,900	7,433,600
FOOD & KINDRED PRODUCTS	93,230	124,552	116,680	138,027	134,938	178,300	215,800	269,700	335,200	423,000
TEXTILE MILL PRODUCTS	6,657	3,153	2,543	2,581	2,444	2,900	3,400	4,000	4,700	5,800
APPAREL & OTHER FABRIC PRODUCTS	23,412	29,971	33,239	42,493	43,099	66,600	92,700	131,800	184,100	258,500
LUMBER PRODUCTS & FURNITURE	50,740	45,143	37,243	48,705	50,407	67,000	85,000	111,600	145,400	192,400
PAPER & ALLIED PRODUCTS	43,269	59,361	49,724	70,205	74,604	115,600	167,600	249,600	366,300	531,400
PRINTING & PUBLISHING	18,599	20,910	21,993	30,058	31,031	51,600	78,500	121,600	185,900	281,100
CHEMICALS & ALLIED PRODUCTS	46,609	94,727	99,509	175,674	194,991	341,900	542,300	873,300	1,370,700	2,129,700
PETROLEUM REFINING	63,145	75,277	67,629	123,620	76,432	95,400	117,500	148,700	186,200	237,100
PRIMARY METALS	2,654	23,786	27,214	33,367	35,005	45,100	56,500	72,200	90,900	115,300
FABRICATED METALS & ORDNANCE	13,748	31,093	49,553	173,258	109,530	191,500	298,500	473,500	793,100	1,121,900
MACHINERY, EXCLUDING ELECTRICAL		13,980	15,351	25,385	25,769	43,200	67,100	106,300	164,000	251,700
ELECTRICAL MACHINERY & SUPPLIES		1,206	1,068	703	901	1,600	2,100	3,300	5,900	7,700
TOTAL MACHINERY (1950 ONLY)	6,015		254	439	409	700	1,200	2,100	3,800	6,100
MOTOR VEHICLES & EQUIPMENT	119	394		111,213	119,178	209,300	326,700	519,400	806,200	1,244,300
TRANS. EQUIP., EXCL. MTR. VEHs.	24,756	39,391	53,704	111,213	119,178	209,300	326,700	519,400	806,200	1,244,300
OTHER MANUFACTURING	27,655	42,660	43,313	18,335	67,959	111,600	168,300	259,400	392,600	536,900
TRANS., COMM. & PUBLIC UTILITIES	291,126	342,712	347,654	473,109	497,799	743,600	1,045,500	1,515,400	2,167,800	3,105,500
RAILROAD TRANSPORTATION	56,912	54,534	48,709	44,715	46,439	58,700	67,300	77,500	86,400	99,000
TRUCKING & WAREHOUSING	18,493	36,201	40,070	46,779	68,595	110,000	162,000	244,800	363,600	538,600
OTHER TRANSPORTATION & SERVICES	133,516	165,653	174,694	241,791	254,074	378,000	529,300	763,900	1,087,000	1,465,100
COMMUNICATIONS	25,151	42,860	44,102	46,060	72,505	112,400	168,100	257,100	384,800	572,500
UTILITIES (ELEC., GAS, SANITARY)	17,047	43,668	39,786	56,184	56,184	84,300	118,600	172,000	245,800	342,700
WHOLESALE & RETAIL TRADE	420,577	595,070	588,840	819,223	875,759	1,453,400	2,154,600	3,278,100	4,891,000	7,234,500
FINANCE, INSURANCE & REAL ESTATE	82,149	155,373	162,044	241,365	250,779	407,000	598,400	900,900	1,331,600	1,951,700
SERVICES	249,550	392,701	430,241	676,791	709,410	1,278,000	2,019,100	3,227,900	5,004,700	7,662,600
LODGING PLACES & PERSONAL SERV.	31,171	48,224	51,019	79,604	80,590	134,600	196,300	293,300	430,500	627,800
BUSINESS & REPAIR SERVICES	22,329	49,641	57,791	12,246	150,191	266,000	420,500	671,400	1,036,000	1,572,400
AMUSEMENT & RECREATION SERVICES	21,253	17,770	20,648	24,781	26,137	41,700	61,000	91,500	134,300	195,500
PRIVATE HOUSEHOLDS	66,426	80,241	79,197	67,334	68,728	87,100	102,100	121,600	141,800	177,900
PROFESSIONAL SERVICES	108,374	196,820	221,587	362,821	363,662	748,300	1,238,600	2,049,900	3,261,900	5,076,700
GOVERNMENT	241,589	385,505	447,999	644,549	666,467	1,274,100	2,053,900	3,310,500	5,136,500	7,817,000
CIVILIAN GOVERNMENT	202,135	348,770	410,682	614,703	635,373	1,235,900	2,004,300	3,246,000	5,053,100	7,748,000
FEDERAL GOVERNMENT	74,879	89,000	104,692	146,523	151,031	263,400	369,600	574,400	808,300	1,205,100
STATE & LOCAL GOVERNMENT	127,255	259,767	305,990	468,182	484,343	972,500	1,614,600	2,671,600	4,244,200	6,603,400
ARMED FORCES	39,452	36,740	37,317	29,848	31,095	38,200	49,600	64,500	83,400	108,400

POPULATION, APRIL 1, 1970 2,149,269

Reproduced from: U. S. Waters Resource Council, 1972 OBERS Projections, Vol. 2.

TABLE 2. POPULATION, AND EMPLOYMENT BY INDUSTRY, HISTORICAL AND PROJECTED.
SELECTED YEARS, 1940-2020

	1940	1950	1960	1966	1980	1990	2000	2010	2020
POPULATION	1,305,128	1,529,418	1,834,489	2,092,280	2,460,700	2,804,500	3,153,000	3,358,700	4,012,700
EMPLOYMENT/POPULATION RATIO	.33	.35	.32	.34	.36	.36	.37	.38	.39
TOTAL EMPLOYMENT	431,096	530,342	608,608	715,262	888,500	1,014,100	1,181,900	1,358,100	1,946,000
AGRICULTURE, FORESTRY & FISHERIES	114,188	80,792	35,123	31,324	23,000	20,100	18,600	18,400	18,400
AGRICULTURE	108,634	74,657	31,307	26,491	17,600	14,500	12,600	12,600	12,600
FORESTRY & FISHERIES	5,554	6,135	3,816	4,833	5,400	5,600	5,900	5,800	5,800
MINING	3,487	9,211	18,393	23,556	24,000	24,400	24,700	24,900	24,900
CONTRACT CONSTRUCTION	22,275	38,840	48,619	85,309	83,600	93,200	106,100	118,600	131,400
MANUFACTURING	67,486	92,149	112,708	119,171	148,600	171,200	201,000	234,000	270,600
FOOD & KINDRED PRODUCTS	15,322	18,542	23,002	21,335	20,100	19,300	18,600	18,000	17,500
TEXTILE MILL PRODUCTS	3,476	2,217	1,144	864	600	500	400	300	300
APPAREL & OTHER FABRIC PRODUCTS	5,009	6,820	8,470	8,501	9,400	9,900	10,400	10,800	11,200
PRINTING & PUBLISHING	3,407	4,531	5,212	5,668	7,500	8,700	10,300	12,100	14,100
CHEMICALS & ALLIED PRODUCTS	4,111	6,763	12,591	12,950	22,500	30,700	41,600	54,400	69,200
LUMBER PRODUCTS & FURNITURE	14,896	18,811	13,054	8,980	8,400	8,200	8,100	7,900	7,800
MACHINERY, ALL	1,485	2,400	4,494	7,073	9,600	11,500	14,000	16,600	19,400
MACHINERY, EXCL. ELECTRICAL		2,069	3,360	5,049	6,800	8,100	9,900	11,700	13,600
ELEC. MACHINERY & SUPPLIES		331	1,134	2,024	2,800	3,400	4,100	4,900	5,700
TRANSPORTATION EQUIPMENT	2,224	4,132	6,758	13,434	20,500	25,200	31,300	37,700	44,700
MOTOR VEHICLES & EQUIPMENT	297	226	354	268	200	200	300	300	300
TRANS. EQUIP., EX. MTR. VEHs.	1,927	3,906	6,404	13,166	20,200	24,900	31,000	37,400	44,300
OTHER MANUFACTURING	17,556	27,933	37,983	40,366	49,700	56,700	65,900	75,600	86,200
PAPER & ALLIED PRODUCTS		7,749	9,422	8,671	10,900	12,400	14,500	16,600	18,900
PETROLEUM REFINING		10,698	11,663	9,127	8,800	8,600	8,400	8,300	8,200
PRIMARY METALS		1,107	3,941	4,462	4,400	4,400	4,500	4,500	4,500
FABRICATED METALS & ORDNANCE		2,945	5,074	9,469	14,200	17,800	22,500	27,700	33,400
MISCELLANEOUS MANUFACTURING		5,434	7,883	8,637	11,200	13,200	15,700	18,300	21,100
TRANS., COMM., & PUBLIC UTILITIES	35,624	52,362	59,215	67,693	82,900	91,200	102,600	113,700	125,200
TRANSPORTATION	28,298	39,058	42,101	50,180	60,400	65,500	72,700	79,700	86,800
RAILROAD TRANSPORTATION	9,161	11,521	8,482	6,564	5,900	5,300	4,800	4,300	3,800
TRUCKING & WAREHOUSING	5,059	5,546	8,306	9,332	11,800	13,700	16,200	18,700	21,300
OTHER TRANSPORTATION SERVICES	14,078	21,991	25,313	34,284	42,600	46,400	51,700	56,600	61,600
COMMUNICATIONS	3,461	6,087	7,507	7,782	10,600	12,400	14,700	17,000	19,500
UTILITIES (ELEC., GAS, SANITARY)	3,865	7,217	9,607	9,731	11,800	13,200	15,100	16,900	18,800
WHOLESALE & RETAIL TRADE	70,571	106,685	124,949	136,761	173,100	196,300	227,600	259,600	293,100
FINANCE, INSURANCE & REAL ESTATE	10,757	15,295	25,204	30,117	40,600	46,900	54,900	63,000	71,400
SERVICES	92,605	107,776	151,034	183,957	257,900	306,500	368,900	434,500	503,600
BUSINESS SERVICES	64,153	62,698	76,731	82,024	94,200	98,400	105,800	113,200	121,300
LODGING PLACES & PERS. SERV.	16,081	17,827	20,684	22,495	26,900	28,100	30,200	32,100	34,200
BUSINESS & REPAIR SERVICES	6,548	11,392	15,061	23,187	32,200	39,200	47,700	56,300	65,300
AMUSEMENT & REC. SERVICES	3,956	5,771	4,633	4,588	6,100	6,800	7,700	8,700	9,500
PRIVATE HOUSEHOLDS	37,568	27,708	36,353	31,754	28,900	24,200	20,000	16,000	12,400
PROFESSIONAL SERVICES	28,452	45,078	74,303	101,933	163,700	208,000	263,100	321,200	382,200
GOVERNMENT	14,103	27,232	33,363	37,374	54,500	64,000	77,000	91,100	107,000
CIVILIAN GOVERNMENT	13,651	22,732	27,410	34,842	52,000	61,600	74,600	88,700	104,500
ARMED FORCES	452	4,500	3,953	2,532	2,400	2,400	2,400	2,400	2,400

TABLE 1. POPULATION, EMPLOYMENT, PERSONAL INCOME, AND EARNINGS BY INDUSTRY, HISTORICAL AND PROJECTED.
SELECTED YEARS, 1950 - 2020

	1950	1959	1962	1968	1969	1980	1990	2000	2010	2020
POPULATION, MIDYEAR	534,509	645,826	702,074	745,208	747,587	787,400	834,400	890,500	959,000	1,041,000
PER CAPITA INCOME (1967\$)	1,258	1,609	1,701	2,301	2,354	3,361	4,482	6,121	8,233	11,054
PER CAPITA INCOME RELATIVE (US=1.00)	.61	.66	.66	.71	.69	.71	.73	.74	.76	.78
TOTAL EMPLOYMENT	162,464	195,256	211,127			276,400	293,200	320,200	350,400	384,000
EMPLOYMENT/POPULATION RATIO	.30	.30	.30			.35	.35	.36	.37	.37
EARNINGS PER WORKER (1967\$)	3,232	4,294	4,430			7,504	9,903	13,111	17,258	22,820
EARNINGS PER WORKER RELATIVE (US=1.00)	.72	.80	.77			.80	.81	.83	.84	.86
IN THOUSANDS OF 1967 \$										
TOTAL PERSONAL INCOME	672,534	1,039,151	1,194,456	1,759,637	1,759,713	2,646,000	3,740,300	5,451,100	7,903,700	11,518,100
TOTAL EARNINGS	525,075	830,471	935,300	1,403,931	1,391,491	2,074,000	2,904,100	4,199,300	6,047,400	8,763,300
AGRICULTURE, FORESTRY & FISHERIES	123,233	94,356	106,162	143,162	95,737	122,400	131,700	156,400	204,100	273,700
AGRICULTURE	118,299	91,403	102,909	139,728	92,851	117,600	125,000	147,200	191,400	256,800
FORESTRY & FISHERIES	4,932	2,953	3,251	3,437	2,888	4,800	6,600	9,200	12,600	16,900
MINING	46,449	107,250	111,153	147,289	155,971	206,000	256,600	322,200	392,800	477,700
CRUDE PETROLEUM & NATURAL GAS	43,823	98,161	105,010	140,004	148,566	195,200	242,100	302,300	365,600	446,200
NONMETALLIC, EXCEPT FUELS	2,627	9,088	6,143	7,284	7,405	10,800	14,400	19,900	27,100	37,400
CONTRACT CONSTRUCTION	27,777	65,466	51,302	127,696	124,108	173,000	234,900	329,900	462,300	651,100
MANUFACTURING	83,817	112,253	124,900	184,856	189,150	283,000	400,700	586,000	847,900	1,236,000
FOOD & KINDRED PRODUCTS	22,746	23,313	26,751	33,025	32,213	39,900	47,000	57,200	69,900	87,400
TEXTILE MILL PRODUCTS	0	0	0	12	12	(S)	(S)	(S)	(S)	(S)
APPAREL & OTHER FABRIC PRODUCTS	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
LUMBER, PRODUCTS & FURNITURE	17,039	9,014	9,693	11,471	13,023	16,900	21,400	27,400	35,200	46,000
PAPER & ALLIED PRODUCTS	1,986	5,013	5,061	4,599	4,846	11,400	17,600	27,800	42,800	65,700
PRINTING & PUBLISHING	(D)	(D)	(D)	4,599	4,914	7,600	11,200	17,000	25,300	36,800
CHEMICALS & ALLIED PRODUCTS	15,889	25,421	28,339	39,083	42,844	68,500	101,000	152,300	225,700	332,000
PETROLEUM REFINING	20,175	33,403	35,215	54,184	51,601	72,500	135,400	183,000	250,700	332,000
PRIMARY METALS	0	0	0	15	(D)	(D)	(D)	(D)	(D)	(D)
FABRICATED METALS & ORDNANCE	31	2,124	2,948	5,420	5,141	10,600	18,800	33,700	57,900	96,900
MACHINERY, EXCLUDING ELECTRICAL		4,805	5,577	8,384	9,533	16,200	25,800	41,200	65,100	100,700
TOTAL MACHINERY (1950 ONLY)	1,534	0	0	80	69	(S)	(S)	(S)	(S)	(S)
MOTOR VEHICLES & EQUIPMENT	0	0	0	13,463	14,646	25,100	38,300	59,800	91,200	136,800
TRANS., EQUIP., EXCL. MTR. VEH.	809	1,698	3,806	8,952	9,742	9,900	16,100	26,500	41,400	65,700
OTHER MANUFACTURING	1,326	4,282	4,056	5,952	5,742	9,900	16,100	26,500	41,400	65,700
TRANS., COMM. & PUBLIC UTILITIES	32,091	65,096	64,777	88,211	93,650	148,000	221,500	341,800	521,500	791,900
RAILROAD TRANSPORTATION	14,510	13,375	11,803	10,315	9,914	11,700	13,000	14,500	15,900	17,000
TRUCKING & WAREHOUSING	9,459	10,418	8,513	12,256	13,879	20,900	29,900	43,900	64,300	97,200
OTHER TRANSPORTATION & SERVICES	3,503	15,582	18,030	33,586	34,223	64,000	104,600	173,400	279,800	446,200
COMMUNICATIONS	3,446	10,690	10,513	14,023	16,656	24,000	34,500	51,100	75,100	110,700
UTILITIES (ELEC., GAS, SANITARY)	3,174	15,033	15,918	16,530	18,975	27,100	39,400	56,200	86,200	127,000
WHOLESALE & RETAIL TRADE	95,100	142,337	146,158	198,520	208,795	323,300	458,500	672,100	979,100	1,433,900
FINANCE, INSURANCE & REAL ESTATE	10,343	23,667	23,576	34,074	34,195	53,600	78,800	118,700	177,300	265,800
SERVICES	57,074	91,785	96,937	146,137	153,776	255,500	386,300	596,100	911,800	1,383,200
LODGING PLACES & PERSONAL SERV.	6,001	9,548	9,442	15,683	15,602	24,600	34,900	51,100	74,400	108,900
BUSINESS & REPAIR SERVICES	2,633	9,132	11,428	28,398	31,215	52,100	80,000	124,400	189,700	286,800
AMUSEMENT & RECREATION SERVICES	2,839	2,115	2,579	3,905	4,218	6,300	9,100	13,500	19,800	29,100
PRIVATE HOUSEHOLDS	19,054	28,314	27,831	22,077	22,674	26,000	28,500	32,100	35,900	41,200
PROFESSIONAL SERVICES	26,548	42,677	45,658	76,079	80,068	146,300	233,700	376,900	591,800	917,100
GOVERNMENT	49,190	136,261	210,333	334,051	336,110	508,700	734,900	1,073,600	1,550,300	2,244,300
CIVILIAN GOVERNMENT	45,626	90,894	107,573	162,469	167,740	301,900	466,600	725,000	1,099,300	1,638,300
FEDERAL GOVERNMENT	3,395	13,887	19,439	23,779	25,266	41,800	60,200	86,800	122,300	167,900
STATE & LOCAL GOVERNMENT	40,232	77,004	88,132	138,696	142,475	260,100	406,400	638,100	977,000	1,470,400
ARMED FORCES	3,564	45,369	102,761	171,582	168,369	206,700	268,200	348,300	451,000	585,900

TABLE 2. POPULATION, AND EMPLOYMENT BY INDUSTRY, HISTORICAL AND PROJECTED.
SELECTED YEARS, 1940-2020

	1940	1950	1960	1966	1980	1990	2000	2010	2020
POPULATION	464,393	531,839	655,695	734,250	787,400	834,400	890,500	959,900	1,041,000
EMPLOYMENT/POPULATION RATIO	.29	.31	.30	.34	.35	.35	.36	.37	.37
TOTAL EMPLOYMENT	136,104	162,484	195,256	246,340	276,400	293,200	320,200	350,400	384,000
AGRICULTURE, FORESTRY & FISHERIES	62,827	46,178	26,222	21,885	14,700	12,500	11,400	11,200	11,300
AGRICULTURE	61,013	44,011	25,134	20,506	13,100	10,700	9,500	9,300	9,300
FORESTRY & FISHERIES	1,814	2,167	1,088	1,379	1,600	1,700	1,800	1,900	2,000
MINING	5,288	8,216	13,523	16,570	16,100	15,800	15,600	15,300	15,000
CONTRACT CONSTRUCTION	5,636	12,348	16,779	17,677	19,600	20,800	22,800	24,800	27,000
MANUFACTURING	11,850	20,699	23,423	27,312	32,500	35,900	40,400	45,100	50,200
FOOD & KINDRED PRODUCTS	4,039	5,245	5,295	5,929	5,300	4,900	4,500	4,200	4,000
TEXTILE MILL PRODUCTS	27	68	30	31	(S)	(S)	(S)	(S)	(S)
APPAREL & OTHER FABRIC PRODUCTS	53	59	101	220	300	300	400	500	500
PRINTING & PUBLISHING	424	773	1,266	1,454	1,700	1,800	2,000	2,200	2,400
CHEMICALS & ALLIED PRODUCTS	1,163	3,246	4,373	5,390	7,300	8,500	10,100	11,700	13,300
LUMBER PRODUCTS & FURNITURE	4,887	4,908	2,545	2,378	2,200	2,100	2,100	2,000	2,000
MACHINERY, ALL	283	419	795	1,623	2,300	2,800	3,500	4,200	5,100
MACHINERY, EXCL. ELECTRICAL		394	702	1,474	2,000	2,500	3,100	3,800	4,500
ELEC. MACHINERY & SUPPLIES		25	93	149	200	200	300	400	500
TRANSPORTATION EQUIPMENT	153	366	762	2,601	3,500	3,900	4,500	5,100	5,700
MOTOR VEHICLES & EQUIPMENT	4	4	12	(S)	(S)	(S)	(S)	(S)	(S)
TRANS. EQUIP., EX. MTR. VEHs.	149	362	750	2,601	3,400	3,900	4,500	5,100	5,700
OTHER MANUFACTURING	821	5,615	8,329	7,686	9,700	11,200	12,900	14,800	16,700
PAPER & ALLIED PRODUCTS		685	1,243	961	1,200	1,400	1,700	2,000	2,300
PETROLEUM REFINING		3,975	5,124	4,607	5,500	6,200	6,800	7,500	8,200
PRIMARY METALS		131	95	99	(S)	(S)	(S)	(S)	(S)
FABRICATED METALS & ORDNANCE		162	643	976	1,400	1,800	2,300	2,800	3,400
MISCELLANEOUS MANUFACTURING		662	1,154	1,043	1,300	1,600	2,000	2,300	2,700
TRANS., COMM. & PUBLIC UTILITIES	5,924	10,654	14,449	18,617	24,000	27,400	31,900	36,700	41,800
TRANSPORTATION	4,595	7,222	8,952	11,205	14,700	16,900	19,900	23,000	26,400
RAILROAD TRANSPORTATION	2,082	2,914	2,071	1,596	1,100	900	800	700	600
TRUCKING & WAREHOUSING	1,032	1,423	2,152	1,728	2,300	2,600	3,000	3,400	3,800
OTHER TRANSPORTATION SERVICES	1,481	2,685	4,809	7,881	11,200	13,300	16,000	18,800	21,800
COMMUNICATIONS	594	1,281	2,114	2,204	2,800	3,000	3,400	3,800	4,300
UTILITIES (ELEC., GAS, SANITARY)	735	2,151	3,353	5,208	6,500	7,300	8,500	9,800	11,100
WHOLESALE & RETAIL TRADE	17,235	28,721	39,121	42,806	49,400	52,000	56,400	61,100	66,500
FINANCE, INSURANCE & REAL ESTATE	1,402	2,427	4,996	5,529	6,800	7,600	8,700	9,900	11,200
SERVICES	23,744	29,119	45,219	57,865	72,900	79,200	89,000	99,600	111,500
BUSINESS SERVICES	17,034	18,045	25,722	27,693	30,100	28,800	28,700	29,000	29,800
LODGING PLACES & PERS. SERV.	3,133	3,931	5,858	6,797	7,600	7,200	7,200	7,300	7,500
BUSINESS & REPAIR SERVICES	2,030	3,707	4,806	7,524	11,600	12,700	14,100	15,500	17,000
AMUSEMENT & REC. SERVICES	748	1,235	1,649	1,646	1,900	1,900	1,900	2,000	2,100
PRIVATE HOUSEHOLDS	11,123	9,172	13,609	11,726	8,800	6,900	5,400	4,100	3,100
PROFESSIONAL SERVICES	6,710	11,074	19,497	30,172	42,700	50,400	60,200	70,500	81,600
GOVERNMENT	2,198	4,122	11,108	38,079	40,000	41,500	43,700	46,200	49,100
CIVILIAN GOVERNMENT	2,198	3,982	6,781	7,563	10,500	12,100	14,300	16,800	19,700
ARMED FORCES		140	5,227	30,516	29,400	29,400	29,400	29,400	29,400

TABLE 1. POPULATION, EMPLOYMENT, PERSONAL INCOME, AND EARNINGS BY INDUSTRY, HISTORICAL AND PROJECTED, SELECTED YEARS, 1950 - 2020

	1950	1959	1962	1968	1969	1980	1990	2000	2010	2020
POPULATION, MIDEAR	299,857	366,967	389,881	389,319	394,710	463,100	545,400	630,100	736,500	830,000
PER CAPITA INCOME (1967\$)	1,812	2,207	2,245	2,980	3,062	4,339	5,628	7,661	10,173	13,458
PER CAPITA INCOME RELATIVE (US=1.00)	.88	.90	.87	.90	.90	.91	.91	.92	.93	.94
TOTAL EMPLOYMENT	106,986	126,399	126,917			173,300	203,200	243,800	289,000	341,100
EMPLOYMENT/POPULATION RATIO	.36	.34	.33			.37	.37	.39	.39	.40
EARNINGS PER WORKER (1967\$)	4,217	5,296	5,664			9,259	11,917	15,459	20,001	26,062
EARNINGS PER WORKER RELATIVE (US=1.00)	.94	.99	.98			.99	.98	.98	.98	.98
IN THOUSANDS OF 1967 \$										
TOTAL PERSONAL INCOME	543,416	809,828	875,332	1,160,043	1,208,538	2,009,500	3,069,500	4,827,900	7,472,400	11,579,000
TOTAL EARNINGS	451,146	669,470	718,906	944,832	989,100	1,605,200	2,422,600	3,769,900	5,781,600	8,990,100
AGRICULTURE, FORESTRY & FISHERIES	14,078	14,443	13,880	7,219	6,655	9,200	10,900	13,400	17,600	23,700
AGRICULTURE	13,024	13,339	12,635	6,263	5,751	7,700	8,800	10,400	13,600	18,300
FORESTRY & FISHERIES	1,054	1,106	1,245	959	901	1,500	2,100	2,900	4,000	5,400
MINING	14,920	39,740	28,111	23,030	(D)	26,300	30,500	36,300	42,500	50,400
CRUDE PETROLEUM & NATURAL GAS	(D)	(D)	(D)	(D)	(D)	22,300	25,200	29,000	32,500	36,500
NONMETALLIC EXCEPT FUELS	(D)	(D)	(D)	(D)	(D)	4,000	5,300	7,300	10,000	13,900
CONTRACT CONSTRUCTION	31,631	48,775	57,260	77,171	84,312	128,400	188,500	285,700	427,400	640,200
MANUFACTURING	172,488	244,356	278,970	386,671	413,605	626,300	903,400	1,347,500	1,991,800	2,965,100
FOOD & KINDRED PRODUCTS	8,100	8,501	8,208	8,082	7,442	10,900	14,900	20,800	29,000	41,700
TEXTILE MILL PRODUCTS	(D)	(D)	(D)	0	0	(S)	(S)	(S)	(S)	(S)
APPAREL & OTHER FABRIC PRODUCTS	(D)	(D)	(D)	157	140	(S)	(S)	(S)	(S)	(S)
LCB&R PRODUCTS & FURNITURE	13,838	10,538	10,958	15,839	16,352	23,900	32,600	45,800	63,500	80,700
PAPER & ALLIED PRODUCTS	2,317	7,795	8,953	15,081	19,849	31,700	46,900	71,500	106,900	154,100
PRINTING & PUBLISHING	2,596	3,503	3,779	4,575	(D)	8,000	12,500	20,100	31,700	50,700
CHEMICALS & ALLIED PRODUCTS	20,777	46,802	70,426	87,872	95,918	178,000	295,700	496,100	807,800	1,297,300
PETROLEUM REFINING	102,014	129,634	133,441	177,097	183,125	231,000	287,700	367,600	463,500	595,100
PRIMARY METALS	(D)	(D)	(D)	(D)	4,295	5,300	6,500	8,000	9,900	12,400
FABRICATED METALS & ORDNANCE	4,071	10,588	17,752	19,900	21,586	36,000	54,400	83,400	125,300	186,700
MACHINERY, EXCLUDING ELECTRICAL		4,704	5,426	8,059	(D)	15,100	22,600	35,200	52,900	79,300
ELECTRICAL MACHINERY & SUPPLIES		(D)	(D)	(D)	(D)	1,000	1,600	2,600	4,000	6,100
TOTAL MACHINERY (1950 ONLY)	2,993									
MOTOR VEHICLES & EQUIPMENT	119	163	149	138	157	(S)	(S)	(S)	(S)	(S)
TRANS. EQUIP., EXCL. MTR. VEHs.	10,895	15,393	13,051	(D)	(D)	73,400	111,000	171,300	259,600	390,700
OTHER MANUFACTURING	3,212	4,591	4,191	10,703	6,383	10,500	15,700	23,900	35,900	53,100
TRANS., COMM. & PUBLIC UTILITIES	45,011	67,268	67,953	82,454	83,689	128,300	181,000	264,700	382,600	556,100
RAILROAD TRANSPORTATION	7,684	8,699	7,886	7,440	6,875	8,800	10,500	12,700	14,900	17,300
TRUCKING & WAREHOUSING	2,935	5,173	5,496	9,299	9,841	16,000	24,700	39,100	61,100	81,100
OTHER TRANSPORTATION & SERVICES	23,286	34,089	32,858	40,535	40,249	62,900	87,600	126,000	178,300	252,500
COMMUNICATIONS	4,974	7,548	7,203	9,234	10,622	16,800	26,300	42,200	66,400	104,000
UTILITIES (ELEC., GAS, SANITARY)	6,135	11,759	14,511	15,944	16,103	23,500	31,700	44,500	61,700	85,700
WHOLESALE & RETAIL TRADE	74,397	102,915	104,844	125,543	128,824	219,900	340,200	542,700	850,000	1,332,100
FINANCE, INSURANCE & REAL ESTATE	11,934	21,890	22,280	30,785	(D)	51,100	79,600	127,300	200,000	314,300
SERVICES	50,000	68,941	77,407	113,003	116,614	214,000	349,900	581,900	941,400	1,508,200
LODGING PLACES & PERSONAL SERV.	7,252	10,364	11,162	15,150	15,473	26,100	38,900	59,600	90,300	137,200
BUSINESS & REPAIR SERVICES	3,093	6,256	7,558	19,004	18,164	33,500	56,200	95,500	157,100	259,100
AMUSEMENT & RECREATION SERVICES	3,703	2,963	3,330	2,593	2,286	3,800	5,900	9,500	15,100	23,800
PRIVATE HOUSEHOLDS	15,400	12,852	13,070	10,218	10,529	13,300	16,100	19,800	24,000	29,700
PROFESSIONAL SERVICES	20,553	36,506	42,289	66,040	69,962	137,000	232,700	397,300	654,800	1,062,300
GOVERNMENT	36,682	61,146	68,198	98,954	103,259	201,400	338,100	570,000	927,900	1,499,500
CIVILIAN GOVERNMENT	29,945	49,529	55,495	91,843	96,198	192,700	326,900	555,400	909,000	1,475,200
FEDERAL GOVERNMENT	9,007	8,456	9,166	13,294	13,344	24,500	38,600	60,700	91,300	133,100
STATE & LOCAL GOVERNMENT	20,936	41,075	50,330	78,549	82,855	168,200	288,300	494,700	817,600	1,339,100
ARMED FORCES	6,739	11,617	8,703	7,111	7,061	8,600	11,200	14,600	18,900	24,700

TABLE 2. POPULATION, AND EMPLOYMENT BY INDUSTRY, HISTORICAL AND PROJECTED.
SELECTED YEARS, 1940-2020

	1940	1950	1960	1966	1980	1990	2000	2010	2020
POPULATION	221,725	297,358	373,783	384,387	463,100	545,400	630,100	734,500	860,600
EMPLOYMENT/POPULATION RATIO	.33	.36	.34	.36	.37	.37	.39	.39	.40
TOTAL EMPLOYMENT	72,937	106,986	126,399	138,469	173,300	203,200	243,800	289,000	341,100
AGRICULTURE, FORESTRY & FISHERIES	7,427	4,905	2,974	2,475	1,700	1,500	1,400	1,400	1,400
AGRICULTURE	7,244	4,577	2,674	2,093	1,200	1,000	900	900	900
FORESTRY & FISHERIES	183	328	300	382	400	400	400	500	500
MINING	1,605	2,332	2,918	2,824	2,300	2,100	1,900	1,700	1,600
CONTRACT CONSTRUCTION	4,075	9,412	10,474	13,728	13,000	15,100	18,000	21,100	24,700
MANUFACTURING	22,205	33,280	39,386	45,387	56,600	65,500	77,000	89,700	103,700
FOOD & KINDRED PRODUCTS	1,186	1,286	1,816	1,621	1,400	1,500	1,600	1,700	1,900
TEXTILE MILL PRODUCTS	8	34	8	10	(5)	(5)	(5)	(5)	(5)
APPAREL & OTHER FABRIC PRODUCTS	26	31	52	55	(5)	(5)	(5)	(5)	(5)
PRINTING & PUBLISHING	534	850	1,052	1,160	1,500	1,700	2,000	2,400	2,900
CHEMICALS & ALLIED PRODUCTS	129	2,974	6,109	9,932	16,100	21,000	27,500	34,700	42,800
LUMBER PRODUCTS & FURNITURE	5,583	5,917	4,044	4,815	4,400	4,200	4,100	4,000	3,900
MACHINERY, ALL	368	503	1,441	1,876	2,500	2,900	3,600	4,200	4,800
MACHINERY, EXCL. ELECTRICAL		419	1,319	1,279	1,600	1,500	2,300	2,700	3,100
ELEC. MACHINERY & SUPPLIES		84	122	597	800	1,000	1,200	1,400	1,600
TRANSPORTATION EQUIPMENT	853	1,371	1,865	3,365	5,500	7,000	9,100	11,300	13,800
MOTOR VEHICLES & EQUIPMENT	48	54	20	21	(5)	(5)	(5)	(5)	(5)
TRANS. EQUIP., EX. MTR. VEHs.	805	1,317	1,845	3,344	5,500	7,000	9,000	11,300	13,800
OTHER MANUFACTURING	13,518	20,314	22,999	22,553	24,900	26,700	28,800	31,000	33,200
PAPER & ALLIED PRODUCTS		508	1,206	1,663	2,400	3,000	3,700	4,600	5,600
PETROLEUM REFINING		16,862	18,727	17,222	17,800	18,200	18,600	19,000	19,300
PRIMARY METALS		454	802	327	300	300	400	400	400
FABRICATED METALS & ORDNANCE		1,656	1,408	2,271	3,100	3,700	4,400	5,200	6,000
MISCELLANEOUS MANUFACTURING		834	856	1,070	1,200	1,300	1,500	1,600	1,800
TRANS., COMM., & PUBLIC UTILITIES	6,119	9,089	9,100	9,546	11,700	13,300	15,400	17,600	20,100
TRANSPORTATION	4,560	5,806	5,447	5,528	6,800	7,700	8,900	10,100	11,500
RAILROAD TRANSPORTATION	1,101	1,414	1,275	1,124	800	700	700	700	600
TRUCKING & WAREHOUSING	1,135	940	1,317	1,307	1,800	2,200	2,700	3,200	3,900
OTHER TRANSPORTATION SERVICES	2,324	3,452	2,855	3,097	4,100	4,600	5,400	6,100	6,500
COMMUNICATIONS	604	1,292	1,235	1,450	1,800	2,200	2,700	3,300	3,500
UTILITIES (ELEC., GAS, SANITARY)	955	1,991	2,418	2,568	3,000	3,300	3,700	4,100	4,500
WHOLESALE & RETAIL TRADE	12,703	21,471	25,205	24,891	31,700	36,600	43,500	51,000	59,600
FINANCE, INSURANCE & REAL ESTATE	1,560	2,650	4,034	4,000	5,300	6,400	8,000	9,700	11,700
SERVICES	15,777	19,960	27,254	30,834	43,300	53,100	66,500	81,700	99,300
BUSINESS SERVICES	11,617	12,454	13,958	14,525	15,900	17,000	19,000	21,100	23,700
LODGING PLACES & PERS. SERV.	3,374	4,010	4,669	4,254	5,200	5,600	6,200	6,800	7,500
BUSINESS & REPAIR SERVICES	1,230	2,014	2,745	4,104	5,300	6,600	8,400	10,300	12,500
AMUSEMENT & REC. SERVICES	661	922	851	878	800	900	1,100	1,200	1,400
PRIVATE HOUSEHOLDS	6,352	5,508	5,693	5,289	4,400	3,800	3,200	2,700	2,400
PROFESSIONAL SERVICES	4,160	7,506	13,296	16,309	27,300	36,000	47,500	60,500	75,000
GOVERNMENT	1,466	3,887	5,054	4,784	7,400	9,200	11,800	14,800	18,500
CIVILIAN GOVERNMENT	1,440	2,971	3,637	4,505	7,100	9,000	11,500	14,500	18,100
ARMED FORCES	26	916	1,417	279	200	200	200	200	200

TABLE 1. POPULATION, EMPLOYMENT, PERSONAL INCOME, AND EARNINGS BY INDUSTRY, HISTORICAL AND PROJECTED.
SELECTED YEARS, 1950 - 2020

	1950	1959	1962	1968	1969	1980	1990	2000	2010	2020
POPULATION, MIDYEAR	1,237,035	1,726,229	1,912,731	2,277,747	2,315,356	2,899,800	3,570,200	4,247,600	5,071,200	6,033,800
PER CAPITA INCOME (1967\$)	2,292	2,487	2,472	3,146	3,270	4,499	5,741	7,753	10,190	13,317
PER CAPITA INCOME RELATIVE (US=1.00)	1.11	1.02	.96	.95	.96	.94	.93	.94	.94	.93
TOTAL EMPLOYMENT	485,199	644,796	667,350			1,109,400	1,351,400	1,673,200	2,027,900	2,423,800
EMPLOYMENT/POPULATION RATIO	.39	.37	.35			.38	.38	.39	.40	.40
EARNINGS PER WORKER (1967\$)	4,944	5,514	5,830			9,505	12,087	15,493	19,848	25,590
EARNINGS PER WORKER RELATIVE (US=1.00)	1.10	1.03	1.01			1.01	.99	.98	.97	.96
IN THOUSANDS OF 1967 \$										
TOTAL PERSONAL INCOME	2,881,318	4,293,045	4,727,480	7,166,421	7,571,337	13,045,500	20,495,700	32,930,000	51,678,100	80,352,900
TOTAL EARNINGS	2,398,892	3,555,521	3,890,858	5,909,203	6,305,885	10,545,000	16,335,400	25,923,500	40,291,300	62,027,200
AGRICULTURE, FORESTRY & FISHERIES	114,457	93,298	100,619	90,828	88,827	99,000	109,200	131,600	169,400	227,200
AGRICULTURE	110,718	90,780	97,821	88,523	86,660	95,600	104,800	125,900	161,900	217,600
FORESTRY & FISHERIES	3,740	2,517	2,799	2,303	2,167	3,300	4,300	5,700	7,400	9,600
MINING	258,225	312,953	293,491	310,518	345,395	409,800	468,900	546,500	623,700	715,900
COAL	321	0	0	0	0	(5)	(5)	(5)	(5)	(3)
CRUDE PETROLEUM & NATURAL GAS	238,304	287,104	276,084	292,398	327,201	384,200	435,900	502,300	565,100	637,000
NONMETALLIC, EXCEPT FUELS	19,600	25,846	17,408	18,121	18,197	25,600	33,000	44,100	58,500	78,900
CONTRACT CONSTRUCTION	219,457	231,469	214,333	594,700	633,926	991,000	1,487,000	2,288,500	3,427,700	5,091,900
MANUFACTURING	479,013	843,256	906,501	1,389,479	1,491,313	2,427,300	3,673,700	5,698,900	8,685,600	13,221,100
FOOD & KINDRED PRODUCTS	56,878	77,571	83,051	107,679	113,509	161,800	215,600	293,500	393,600	532,200
TEXTILE MILL PRODUCTS	(D)	(C)	(D)	(D)	(C)	6,000	7,200	9,000	11,200	14,100
APPAREL & OTHER FABRIC PRODUCTS	6,781	7,138	8,110	8,319	(C)	11,500	14,200	17,900	22,600	29,000
LUMBER PRODUCTS & FURNITURE	32,363	26,352	27,591	38,447	38,173	52,300	68,100	91,300	121,500	163,700
PAPER & ALLIED PRODUCTS	(D)	(C)	(D)	28,749	30,178	47,900	71,000	107,700	160,600	239,000
PRINTING & PUBLISHING	22,531	34,129	38,410	55,973	61,068	100,700	156,000	246,900	382,000	590,800
CHEMICALS & ALLIED PRODUCTS	82,288	171,346	207,196	305,500	324,343	585,500	949,700	1,560,500	2,494,000	3,919,700
PETROLEUM REFINING	94,010	164,320	137,940	197,602	211,430	279,000	359,300	573,200	813,900	1,100,000
PRIMARY METALS	27,710	44,882	56,984	82,652	85,410	121,200	164,100	224,700	300,300	403,600
FABRICATED METALS & ORDNANCE	35,160	75,927	91,132	159,167	168,527	299,600	473,200	759,600	1,187,400	1,836,300
MACHINERY, EXCLUDING ELECTRICAL		134,415	137,224	207,705	237,684	389,900	595,100	926,900	1,413,300	2,140,200
ELECTRICAL MACHINERY & SUPPLIES		9,493	11,150	(D)	27,321	58,700	108,900	201,100	355,900	616,800
TOTAL MACHINERY (1950 ONLY)	76,846									
MOTOR VEHICLES & EQUIPMENT	1,699	2,557	4,296	9,124	9,024	13,500	19,400	28,700	41,900	61,300
TRANS. EQUIP., EXCL. MTR. VEH.	9,039	15,173	17,305	58,163	52,689	91,000	140,200	220,700	338,800	518,200
OTHER MANUFACTURING	14,325	51,979	57,904	100,547	118,277	207,700	331,100	536,500	847,800	1,325,400
TRANS., COMM. & PUBLIC UTILITIES	258,966	372,411	383,692	509,116	528,155	807,200	1,152,300	1,694,800	2,459,100	3,571,500
RAILROAD TRANSPORTATION	75,231	75,003	67,061	55,180	53,934	70,500	85,100	103,200	120,300	140,100
TRUCKING & WAREHOUSING	26,232	62,305	70,120	114,218	116,167	181,400	258,100	378,100	546,600	788,100
OTHER TRANSPORTATION & SERVICES	84,660	119,463	121,966	158,917	160,446	246,900	344,500	495,500	702,800	996,500
COMMUNICATIONS	28,346	43,608	49,499	72,352	82,645	132,800	209,600	337,900	531,200	827,200
UTILITIES (ELEC., GAS, SANITARY)	34,294	72,030	74,143	108,452	114,967	175,300	254,800	380,000	558,000	819,400
WHOLESALE & RETAIL TRADE	503,445	721,907	771,116	1,191,629	1,268,463	2,192,800	3,443,400	5,320,900	8,634,800	13,356,100
FINANCE, INSURANCE & REAL ESTATE	127,674	204,027	218,200	340,557	359,371	586,100	885,900	1,368,700	2,069,700	3,107,500
SERVICES	274,459	467,699	537,714	930,097	1,013,299	1,875,500	3,122,300	5,238,200	8,483,100	13,463,600
LODGING PLACES & PERSONAL SERV.	44,480	60,990	67,937	112,563	116,577	197,000	296,600	458,300	694,900	1,064,700
BUSINESS & REPAIR SERVICES	27,223	68,922	86,344	183,302	206,120	369,700	608,100	1,011,600	1,629,000	2,578,700
AMUSEMENT & RECREATION SERVICES	10,285	16,635	20,770	28,772	31,591	51,800	79,400	124,700	191,200	291,100
PRIVATE HOUSEHOLDS	63,948	74,930	76,118	64,879	66,845	87,500	108,100	135,900	166,600	206,600
PROFESSIONAL SERVICES	128,524	246,224	286,544	540,583	592,163	1,169,200	2,029,900	3,507,500	5,801,200	9,341,400
GOVERNMENT	163,197	308,507	365,194	552,297	577,130	1,156,000	1,992,200	3,435,000	5,697,800	9,270,300
CIVILIAN GOVERNMENT	137,107	275,282	332,808	515,826	539,750	1,110,000	1,932,600	3,357,500	5,597,500	9,140,000
FEDERAL GOVERNMENT	43,937	84,605	84,339	146,249	150,749	273,800	429,000	673,100	1,003,900	1,642,000
STATE & LOCAL GOVERNMENT	93,172	210,676	248,471	369,577	388,999	836,100	1,503,500	2,684,300	4,593,600	7,497,000
ARMED FORCES	26,090	33,225	32,383	36,469	37,383	45,900	59,500	77,500	100,300	130,300

TABLE 2. POPULATION, AND EMPLOYMENT BY INDUSTRY, HISTORICAL AND PROJECTED,
SELECTED YEARS, 1940-2020

	1940	1950	1960	1966	1980	1990	2000	2010	2020
POPULATION	931,165	1,246,559	1,758,251	2,116,327	2,899,800	3,570,200	4,247,600	5,071,200	6,033,600
EMPLOYMENT/POPULATION RATIO	.38	.39	.27	.38	.38	.38	.39	.40	.40
TOTAL EMPLOYMENT	351,931	485,199	644,796	795,709	1,109,400	1,351,400	1,673,200	2,027,900	2,423,800
AGRICULTURE, FORESTRY & FISHERIES	62,901	40,073	29,929	24,856	16,000	13,300	12,000	11,700	11,800
AGRICULTURE	62,201	39,091	29,328	24,095	15,200	12,400	11,100	10,800	10,800
FORESTRY & FISHERIES	700	982	601	761	800	800	900	900	900
MINING	12,203	16,052	20,644	24,828	22,800	21,700	20,700	19,800	18,900
CONTRACT CONSTRUCTION	22,247	45,648	50,935	80,166	103,100	122,200	147,500	172,800	200,000
MANUFACTURING	56,585	97,280	136,135	166,438	230,900	280,100	342,900	411,300	486,500
FOOD & KINDRED PRODUCTS	7,761	10,237	13,004	14,490	17,100	18,200	19,300	20,300	21,200
TEXTILE MILL PRODUCTS	1,156	1,269	1,043	864	700	700	600	600	600
APPAREL & OTHER FABRIC PRODUCTS	1,305	1,843	1,071	1,888	1,700	1,600	1,400	1,400	1,400
PRINTING & PUBLISHING	3,834	5,527	7,997	9,348	13,000	15,700	19,200	23,000	27,300
CHEMICALS & ALLIED PRODUCTS	1,536	10,865	23,864	32,024	51,400	66,700	86,600	108,900	133,500
LUMBER PRODUCTS & FURNITURE	7,753	9,807	6,711	6,069	6,100	6,200	6,400	6,500	6,600
MACHINERY, ALL	9,235	12,160	23,471	33,206	48,300	60,500	76,400	93,500	112,200
MACHINERY, EXCL. ELECTRICAL		11,188	20,550	24,384	34,600	42,800	53,500	64,900	77,500
ELEC. MACHINERY & SUPPLIES		972	3,921	8,822	13,600	17,700	22,800	28,500	34,600
TRANSPORTATION EQUIPMENT	2,120	2,336	3,585	5,829	9,100	11,500	14,600	17,900	21,600
MOTOR VEHICLES & EQUIPMENT	410	571	657	869	1,100	1,300	1,600	1,900	2,200
TRANS. EQUIP., EX. MTR. VEHs.	1,710	1,765	2,928	4,960	8,000	10,100	12,900	16,000	19,300
OTHER MANUFACTURING	21,885	43,236	54,088	62,720	83,000	98,600	117,900	138,800	161,700
PAPER & ALLIED PRODUCTS		2,176	3,565	3,654	4,700	5,500	6,500	7,600	8,700
PETROLEUM REFINING		23,697	21,661	16,412	19,000	20,800	22,600	24,400	26,100
PRIMARY METALS		6,555	7,977	10,579	11,500	12,300	13,100	13,800	14,400
FABRICATED METALS & ORDNANCE		6,099	11,005	20,015	29,000	35,500	44,000	53,100	62,900
MISCELLANEOUS MANUFACTURING		4,709	9,880	12,060	18,600	24,200	31,500	39,800	49,400
TRANS., COMM., & PUBLIC UTILITIES	32,956	49,399	59,601	67,021	85,000	97,300	113,600	130,500	148,600
TRANSPORTATION	26,308	34,518	39,665	40,897	48,700	53,800	60,700	67,600	74,700
RAILROAD TRANSPORTATION	10,105	13,400	10,986	8,820	7,200	6,900	6,500	6,100	5,600
TRUCKING & WAREHOUSING	5,970	6,784	11,587	12,799	16,300	18,900	22,200	25,600	29,200
OTHER TRANSPORTATION SERVICES	10,233	14,434	16,692	19,278	25,000	28,000	32,000	35,800	39,700
COMMUNICATIONS	2,595	6,481	7,215	10,083	14,600	17,700	21,900	26,300	31,100
UTILITIES (ELEC., GAS, SANITARY)	4,053	8,300	12,617	16,041	21,600	25,700	30,900	36,600	42,700
WHOLESALE & RETAIL TRADE	65,687	103,431	141,994	163,567	235,400	289,200	359,900	437,300	523,800
FINANCE, INSURANCE & REAL ESTATE	11,935	18,582	30,925	38,540	53,800	64,000	77,400	91,400	106,700
SERVICES	78,940	97,704	152,341	203,822	319,700	409,300	528,200	662,600	813,200
BUSINESS SERVICES	57,301	59,298	76,179	91,084	114,700	129,700	150,300	172,200	196,400
LODGING PLACES & PERS. SERV.	15,926	19,430	23,008	28,430	33,400	36,700	41,400	46,200	51,300
BUSINESS & REPAIR SERVICES	7,186	11,989	18,702	28,454	45,800	58,800	75,800	94,300	114,600
AMUSEMENT & REC. SERVICES	3,052	3,795	4,935	6,815	9,100	10,400	12,200	14,000	15,900
PRIVATE HOUSEHOLDS	31,137	24,084	29,444	27,379	26,200	23,500	20,600	17,500	14,400
PROFESSIONAL SERVICES	21,639	38,406	76,162	112,738	204,900	279,600	377,900	490,100	616,800
GOVERNMENT	8,477	17,030	22,091	26,471	42,300	54,100	70,600	90,300	114,100
CIVILIAN GOVERNMENT	7,369	13,573	19,992	24,840	40,800	52,500	69,000	88,800	112,500
ARMED FORCES	1,108	3,457	2,099	1,631	1,500	1,500	1,500	1,500	1,500

ATTACHMENT H

MATRIX APPENDIX

5/2

ATTACHMENT H

MATRIX ANALYSES

The following contains a presentation of a matrix table for each individual tract proposed for leasing in this sale. The following code will appear at the top of each matrix table and should be translated in accordance with the following.

1	2	3	4	5
---	---	---	---	---

1. Leasing Area

WC = West Cameron

WCW = West Cameron - West Addition

WCS = West Cameron - East Addition

EC = East Cameron

ECS = East Cameron - South Addition

V = Vermilion

VS = Vermilion - South Addition

SMS = South Marsh Island - South Addition

SMN = South Marsh Island - North Addition

E = Eugene Island

ES = Eugene Island - South Addition

SS = Ship Shoal

SSS = Ship Shoal - South Addition

ST = South Timbalier

STS = South Timbalier - South Addition

SPL = South Pelto

G = Grand Isle

GS = Grand Isle - South Addition

WD = West Delta

SP = South Pass

SPSE = South Pass - South and East Addition

MP = Main Pass

MPSE = Main Pass - South and East Addition

GB = Garden Banks

NO S-1 = New Orleans South No. 1

NO = New Orleans

MS - 2 = Mobile South No. 2

MS - 1 = Mobile South No. 1

2. Tract Number

3. Approximate statute miles from tract to shore or nearest island

4. Approximate water depth of tract in meters

5. Estimated type of production

O = Oil

G = Gas

O & G = Oil and Gas

In addition, the following legend will explain the letter headings for columns within each matrix table:

IM = Importance

PR = Proximity

F (ST) = Impact Factor - Structures

F (OS) = Impact Factor - Oil Spills

NA = Not Applicable

NCG = Not Computed, Gas tract

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

WC 2 4 8 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of	0	1.0	0	40		
Estuary/Marsh/Nursery Areas	40	0.4	16	80		
Beaches						
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0.0	20		
Outdoor Recreation	40	0.4	16	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

WC 2 4 8 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of	0	1.0	0	40		
Estuary/Marsh/Nursery Areas	40	0.4	16	80		
Beaches						
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.4	16	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

WC 3 6 7 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of	0	1.0	0	40		
Estuary/Marsh/Nursery Areas	40	0.2	8	80		
Beaches						
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.2	8	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

WC 4 7 7 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of	0	1.0	0	40		
Estuary/Marsh/Nursery Areas	40	0.2	8	80		
Beaches						
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.2	8	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

WC 5 6 8 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.2	8	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.2	8	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

WC 6 7 8 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.2	8	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.2	8	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

WC 7 7 8 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.2	8	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.2	8	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

WC 8 6 8 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.2	8	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.2	8	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

WC 9 9 9 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.2	8	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.2	16	20		
Outdoor Recreation	40	0.2	8	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

WC 10 10 9 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.2	8	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.2	8	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

WC 11 10 9 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.2	8	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.2	8	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

WC 12 10 9 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.2	8	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.2	8	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

WC 13 9 7 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

WC 14 9 7 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

WC 15 10 11 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

WC 16 18 10 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.2	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

WC 17 18 10 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.2	16	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.2	0	80		
Ordinance Disposal Area	100	NA		0		

WC 18 18 10 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.2	0	80		
Ordinance Disposal Area	100	NA		0		

WC 19 24 12 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

WC 20 30 12 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

WC 21 35 12 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		S
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		S
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

WC 22 34 15 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		S
Biota Seaward of	0	1.0	0	40		
Estuary/Marsh/Nursery Areas	40	0.0	0	80		
Beaches						
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		S
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

WC 23 40 18 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		S
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		S
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

WC 24 41 19 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems;</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		{
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		{
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

WC 25 45 21 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

WC 26 44 19 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

WC 27 46 19 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

WC 28 47 19 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

WC 29 61 24 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.2	16	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.0	0	80		
Ordnance Disposal Area	100	NA		0		

WCW 30 48 19 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.8	64	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.0	0	80		
Ordnance Disposal Area	100	NA		0		

WCW 31 51 19 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.0	0	80		
Ordnance Disposal Area	100	NA		0		

WCW 32 52 19 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.8	64	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.0	0	80		
Ordnance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

WCW 33 50 21 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas Biota Seaward of	20	0.0	0	100		
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

WCW 34 54 21 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas Biota Seaward of	20	0.0	0	100		
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20		
Outdoor Recreation	40			80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

WCW 35 57 22 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas Biota Seaward of	20	0.0	0	100		
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

WCW 36 57 22 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas Biota Seaward of	20	0.0	0	100		
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.2	16	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

WCW 37 59 22 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.2	16	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

WCW 38 59 22 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

WCW 39 69 24 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.8	64	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

WCW 40 69 24 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

WCW 41 71 27 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas Biota Seaward of	20	0.0	0	100		
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

WCW 42 71 27 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas Biota Seaward of	20	0.0	0	100		
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.8	64	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

WCW 43 73 30 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas Biota Seaward of	20	0.0	0	100		
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

WCW 44 73 30 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas Biota Seaward of	20	0.0	0	100		
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

WCW 45 73 30 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordnance Disposal Area	100	NA		0		

WCW 46 77 30 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.2	16	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordnance Disposal Area	100	NA		0		

WCS 47 78 37 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.6	48	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordnance Disposal Area	100	NA		0		

WCS 48 79 36 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordnance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

WCS 49 79 36 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas Biota Seaward of	20	0.0	0	100		
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

WCS 50 74 36 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas Biota Seaward of	20	0.0	0	100		
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

WCS 51 74 36 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas Biota Seaward of	20	0.0	0	100		
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.6	48	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

WCS 52 77 38 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas Biota Seaward of	20	0.0	0	100		
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

WCS 53 82 39 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

WCS 54 90 45 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

WCS 55 83 48 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.8	64	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

WCS 56 86 51 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

WCS 57 88 53 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

WCS 58 91 54 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

WCS 59 98 60 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.2	16	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

WCS 60 95 60 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.6	48	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

WCS 61 93 60 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.8	64	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

WCS 62 111 82 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

WCS 63 114 105 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

WCS 64 117 117 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

EC 65 9 11 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.2	4	100		NCG
Unique & Highly Productive Areas	20	0.2	4	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

EC 66 5 9 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.2	4	100		NCG
Unique & Highly Productive Areas	20	0.2	4	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

EC 67 5 9 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.2	4	100		NCG
Unique & Highly Productive Areas	20	0.2	4	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

EC 68 8 11 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.2	4	100		NCG
Unique & Highly Productive Areas	20	0.2	4	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

EC 69 11 12 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

EC 70 8 12 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.2	4	100		NCG
Unique & Highly Productive Areas	20	0.2	4	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

EC 71 9 14 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.2	4	100		NCG
Unique & Highly Productive Areas	20	0.2	4	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

EC 72 11 13 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.2	4	100		NCG
Unique & Highly Productive Areas	20	0.2	4	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

EC 73 12 13 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.2	4	100		NCG
Unique & Highly Productive Areas	20	0.2	4	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

EC 74 67 30 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

EC 75 69 36 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ECS 76 68 36 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

ECS 77 68 36 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ECS 78 70 36 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ECS 79 70 36 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ECS 80 72 36 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.2	16	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

ECS 81 75 39 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.2	16	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ECS 82 78 42 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ECS 83 88 53 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

V 84 6 11 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.2	4	100		NCG
Unique & Highly Productive Areas	20	0.2	4	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

V 85 6 9 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.2	4	100		NCG
Unique & Highly Productive Areas	20	0.2	4	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

V 86 5 7 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.4	8	100		NCG
Unique & Highly Productive Areas	20	0.4	8	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

V 87 5 4 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.4	8	100		NCG
Unique & Highly Productive Areas	20	0.4	8	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

V 88 7 4 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.2	4	100		NCG
Unique & Highly Productive Areas	20	0.2	4	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

V 89 10 12 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.2	4	100		NCG
Unique & Highly Productive Areas	20	0.2	4	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

V 90 13 8 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.2	0	80		
Ordinance Disposal Area	100	NA		0		

V 91 14 12 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.2	0	80		
Ordinance Disposal Area	100	NA		0		

V 92 14 13 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.2	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

V 93 18 14 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.2	0	80		
Ordinance Disposal Area	100	NA		0		

V 94 16 10 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.2	0	80		
Ordinance Disposal Area	100	NA		0		

V 95 37 22 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

V 96 41 24 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

V 97 66 39 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

VS 98 81 60 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

VS 99 81 60 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

VS 100 82 60 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

VS 101 85 64 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

VS 102 85 64 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

VS 103 87 67 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

VS 104 87 67 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

VS 105 91 70 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

VS 106 91 70 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

VS 107 95 82 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

VS 108 99 91 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

SMS 109 70 48 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

SMS 110 73 51 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

SMS 111 73 51 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

SMS 112 74 51 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

SMS 113 76 54 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

SMS 114 76 54 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

SMS 115 76 54 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

SMS 116 79 57 OFG

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.0	0
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.6	48	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

SMS 117 80 57 0FG

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.0	0
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.6	48	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

SMS 118 82 60 0FG

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.0	0
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.6	48	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

SMS 119 85 67 0FG

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.1	10
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.0	0
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

SMS 120 91 82 0FG

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.3	30
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.0	0
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

SMS 121 93 82 0FG

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.3	30
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.0	0
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

SMS 122 96 86 0FG

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.4	40
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.2	16	20	0.8	16
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

SMS 123 99 100 0FG

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.5	50
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

SMS 124 99 100 0FG

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.5	50
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

SMN 125 17 6 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.5	50
Unique & Highly Productive Areas	20	0.0	0	100	0.5	50
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.0	0
Outdoor Recreation	40	0.0	0	80	0.1	8
Commercial Fishing	80	1.0	80	80	1.0	80
Sport Fishing	0	0.2	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

SMN 126 19 6 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.5	50
Unique & Highly Productive Areas	20	0.0	0	100	0.5	50
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.0	0
Outdoor Recreation	40	0.0	0	80	0.1	8
Commercial Fishing	80	1.0	80	80	1.0	80
Sport Fishing	0	0.2	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

SMN 127 24 6 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.3	30
Unique & Highly Productive Areas	20	0.0	0	100	0.3	30
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.0	0
Outdoor Recreation	40	0.0	0	80	0.1	8
Commercial Fishing	80	1.0	80	80	0.6	48
Sport Fishing	0	0.0	0	80	0.6	48
Ordinance Disposal Area	100	NA		0		

SMN 128 26 9 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.3	30
Unique & Highly Productive Areas	20	0.0	0	100	0.3	30
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.0	0
Outdoor Recreation	40	0.0	0	80	0.1	8
Commercial Fishing	80	1.0	80	80	0.5	40
Sport Fishing	0	0.0	0	80	0.5	40
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

E	129	6	5	0/G
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SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.4	8	100	1.0	100
Unique & Highly Productive Areas	20	0.4	8	100	1.0	100
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.0	0
Outdoor Recreation	40	0.0	0	80	0.4	32
Commercial Fishing	80	1.0	80	80	1.0	80
Sport Fishing	0	1.0	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

E	130	9	6	0/G
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SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.2	4	100	0.9	90
Unique & Highly Productive Areas	20	0.2	4	100	0.9	90
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.0	0
Outdoor Recreation	40	0.0	0	80	0.4	32
Commercial Fishing	80	1.0	80	80	1.0	80
Sport Fishing	0	1.0	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

E	131	5	6	0/G
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SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.1	10
Unique & Highly Productive Areas	20	0.2	4	100	0.8	80
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.1	8
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.0	0
Outdoor Recreation	40	0.0	0	80	0.2	16
Commercial Fishing	80	1.0	80	80	1.0	80
Sport Fishing	0	1.0	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

E	132	4	5	G
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SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.2	4	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

E 133 11 7 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

E 134 10 6 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

E 135 11 7 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

E 136 54 39 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

E 137 55 39 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

E 138 55 42 0.6G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.1	10
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.0	0
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.6	48	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

ES 139 66 54 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ES 140 59 54 0.6G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.3	30
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.1	2
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.6	48	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

ES 141 59 57 0 1 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.2	20
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.1	2
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.6	48	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

ES 142 66 57 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40			80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ES 143 67 57 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40			80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ES 144 62 64 0 1 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.2	20
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.2	4
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.6	48	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

ES 145 69 67 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.1	10
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.3	6
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

ES 146 69 70 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.1	10
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.3	6
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

ES 147 68 73 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.2	20
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.3	6
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

ES 148 68 73 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.2	20
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.3	6
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

ES 149 70 76 0EG

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.2	20
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.4	8
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

ES 150 70 76 0EG

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.2	20
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.4	8
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

ES 151 72 73 0EG

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.1	10
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.4	8
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

ES 152 72 73 0EG

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.1	10
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.4	8
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

ES 153 72 82 0/G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.1	10
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.5	10
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

ES 154 72 82 0/G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.2	20
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.5	10
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

ES 155 86 92 0/G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.4	40
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.2	16	20	0.8	16
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

ES 156 86 91 0/G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.4	40
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.2	16	20	0.8	16
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

SS 157 7 7 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.2	4	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.4	16	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.4	16	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

SS 158 9 6 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.2	4	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.2	8	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.2	8	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

SS 159 9 6 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.2	4	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.2	8	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.2	8	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

SS 160 11 9 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

SS 161 32 18 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.1	10
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.1	8
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.0	0
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	1.0	80	80	0.3	24
Sport Fishing	0	0.0	0	80	0.3	24
Ordinance Disposal Area	100	NA		0		

SSS 162 60 64 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.6	60
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.3	6
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.6	48	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

SSS 163 54 64 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas *	20	1.0	20	100	1.0	100
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.3	6
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing *	80	0.8	64	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

* POSSIBLE FISHING BANK

SSS 164 57 67 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.8	16	100	0.9	90
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.4	8
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

SSS 165 69 109 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas * Biota Seaward of Estuary/Marsh/Nursery Areas	20	1.0	20	100	1.0	100
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing *	80	0.6	48	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

* POSSIBLE FISHING BANK

SPL 166 7 9 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas Biota Seaward of Estuary/Marsh/Nursery Areas	20	0.2	4	100		
Beaches	40	0.2	8	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.2	8	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

SPL 167 5 9 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas Biota Seaward of Estuary/Marsh/Nursery Areas	20	0.4	8	100		
Beaches	40	0.4	16	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20		
Outdoor Recreation	40	0.4	16	80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	1.0	0	80		
Ordinance Disposal Area	100	NA		0		

ST 168 9 18 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.4	40
Unique & Highly Productive Areas Biota Seaward of Estuary/Marsh/Nursery Areas	20	0.2	4	100	0.8	80
Beaches	40	0.0	0	80	1.0	40
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.0	0
Outdoor Recreation	40	0.0	0	80	0.4	32
Commercial Fishing	80	1.0	80	80	1.0	80
Sport Fishing	0	1.0	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

ST 169 16 24 08G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.3	30
Unique & Highly Productive Areas	20	0.0	0	100	0.5	50
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.2	16
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.0	0
Outdoor Recreation	40	0.0	0	80	0.2	16
Commercial Fishing	80	1.0	80	80	1.0	80
Sport Fishing	0	0.2	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

ST 170 16 27 08G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.3	30
Unique & Highly Productive Areas	20	0.0	0	100	0.5	50
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.2	16
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.0	0
Outdoor Recreation	40	0.0	0	80	0.2	16
Commercial Fishing	80	1.0	80	80	1.0	80
Sport Fishing	0	0.2	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

ST 171 33 48 08G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.2	4
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.6	48	80	0.3	24
Sport Fishing	0	0.0	0	80	0.3	24
Ordinance Disposal Area	100	NA		0		

ST 172 33 54 08G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.2	4
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.6	48	80	0.3	24
Sport Fishing	0	0.0	0	80	0.3	24
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

ST 173 35 48 06G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.3	6
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.6	48	80	0.3	24
Sport Fishing	0	0.0	0	80	0.3	24
Ordinance Disposal Area	100	NA		0		

ST 174 35 45 06G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.2	4
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.6	48	80	0.3	24
Sport Fishing	0	0.0	0	80	0.3	24
Ordinance Disposal Area	100	NA		0		

ST 175 37 33 06G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.0	0
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.6	48	80	0.2	16
Sport Fishing	0	0.0	0	80	0.2	16
Ordinance Disposal Area	100	NA		0		

STS 176 66 158 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas *	20	1.0	20	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing *	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

* POSSIBLE FISHING BANK

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

G 177 24 43 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.1	10
Unique & Highly Productive Areas	20	0.0	0	100	0.2	20
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.1	8
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.3	6
Outdoor Recreation	40	0.0	0	80	0.1	8
Commercial Fishing	80	0.6	48	80	0.6	48
Sport Fishing	0	0.0	0	80	0.6	48
Ordinance Disposal Area	100	NA		0		

GS 178 30 91 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.1	10
Unique & Highly Productive Areas	20	0.0	0	100	0.1	10
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.3	6
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.4	32
Sport Fishing	0	0.0	0	80	0.4	32
Ordinance Disposal Area	100	NA		0		

GS 179 31 73 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.1	10
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.3	6
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.4	32
Sport Fishing	0	0.0	0	80	0.4	32
Ordinance Disposal Area	100	NA		0		

WD 180 11 18 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.3	30
Unique & Highly Productive Areas	20	0.0	0	100	0.6	60
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.5	40
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.1	2
Outdoor Recreation	40	0.0	0	80	0.5	40
Commercial Fishing	80	1.0	80	80	1.0	80
Sport Fishing	0	1.0	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

WD 181 15 37 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.1	10
Unique & Highly Productive Areas	20	0.0	0	100	0.4	40
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.2	16
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.4	8
Outdoor Recreation	40	0.0	0	80	0.2	16
Commercial Fishing	80	0.6	48	80	1.0	80
Sport Fishing	0	0.2	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

WD 182 9 36 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.5	50
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.1	8
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.7	14
Outdoor Recreation	40	0.0	0	80	0.1	8
Commercial Fishing	80	0.6	48	80	1.0	80
Sport Fishing	0	1.0	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

WD 183 7 55 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.6	60
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.2	16	20	0.9	18
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.6	48	80	1.0	80
Sport Fishing	0	1.0	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

WD 184 8 58 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.5	50
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.2	16	20	0.8	16
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.6	48	80	1.0	80
Sport Fishing	0	1.0	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

WD 185 7 48 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.4	40
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.8	64	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.6	48	80	1.0	80
Sport Fishing	0	1.0	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

WD 186 7 55 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.5	50
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.6	48	80	1.0	80
Sport Fishing	0	1.0	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

SP 187 4 36 0

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.2	4	100	0.9	90
Unique & Highly Productive Areas	20	0.0	0	100	1.0	100
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.2	16
Commercial Fishing	80	0.6	48	80	1.0	80
Sport Fishing	0	1.0	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

SP 188 7 79 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.6	60
Unique & Highly Productive Areas	20	0.2	4	100	0.7	70
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.1	8
Commercial Fishing	80	0.4	32	80	1.0	80
Sport Fishing	0	1.0	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

SP 189 10 182 046

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.4	40
Unique & Highly Productive Areas	20	0.0	0	100	0.5	50
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.8	64	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	1.0	80
Sport Fishing	0	1.0	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

SP 190 5 55 046

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.2	20
Unique & Highly Productive Areas	20	0.0	0	100	0.5	50
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.8	64	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.6	48	80	1.0	80
Sport Fishing	0	1.0	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

SP 191 6 48 0

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.2	20
Unique & Highly Productive Areas	20	0.0	0	100	0.4	40
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.8	64	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.6	48	80	1.0	80
Sport Fishing	0	1.0	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

SP 192 4 37 0

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.2	4	100	0.9	90
Unique & Highly Productive Areas	20	0.2	4	100	1.0	100
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.2	16
Commercial Fishing	80	0.6	48	80	1.0	80
Sport Fishing	0	1.0	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

SPSE 193 9 109 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.2	4	100	0.7	70
Unique & Highly Productive Areas	20	0.2	4	100	0.7	70
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.1	8
Commercial Fishing	80	0.4	32	80	1.0	80
Sport Fishing	0	1.0	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

SPSE 194 7 76 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.2	4	100	0.8	80
Unique & Highly Productive Areas	20	0.2	4	100	0.8	80
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.2	16
Commercial Fishing	80	0.4	32	80	1.0	80
Sport Fishing	0	1.0	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

MP 195 9 12 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.7	70
Unique & Highly Productive Areas	20	0.2	4	100	0.7	70
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.2	8	80	0.7	56
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20	1.0	20
Outdoor Recreation	40	0.2	8	80	0.7	56
Commercial Fishing	80	1.0	80	80	1.0	80
Sport Fishing	0	1.0	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

MP 196 11 13 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.7	70
Unique & Highly Productive Areas	20	0.0	0	100	0.6	60
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.6	48
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.8	64	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.6	48
Commercial Fishing	80	1.0	80	80	1.0	80
Sport Fishing	0	1.0	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

MP 197 11 21 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.5	50
Unique & Highly Productive Areas	20	0.0	0	100	0.7	70
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.3	24
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.3	24
Commercial Fishing	80	1.0	80	80	1.0	80
Sport Fishing	0	1.0	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

MP 198 8 48 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.6	60
Unique & Highly Productive Areas	20	0.0	0	100	0.7	70
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.2	16
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.2	16
Commercial Fishing	80	0.6	48	80	1.0	80
Sport Fishing	0	1.0	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

MP 199 19 18 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20		
Outdoor Recreation	40			80		
Commercial Fishing	80	1.0	80	80		
Sport Fishing	0	0.2	0	80		
Ordinance Disposal Area	100	NA		0		

MP 200 10 13 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.6	60
Unique & Highly Productive Areas	20	0.0	0	100	0.6	60
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.6	48
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.6	48
Commercial Fishing	80	1.0	80	80	1.0	80
Sport Fishing	0	1.0	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

MP 201 18 24 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.5	50
Unique & Highly Productive Areas	20	0.0	0	100	0.4	40
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.4	32
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.4	32
Commercial Fishing	80	1.0	80	80	1.0	80
Sport Fishing	0	0.2	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

MP 202 19 31 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.3	30
Unique & Highly Productive Areas	20	0.0	0	100	0.4	40
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.3	30
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.3	24
Commercial Fishing	80	0.6	48	80	1.0	80
Sport Fishing	0	0.2	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

MP 203 24 45 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.2	20
Unique & Highly Productive Areas	20	0.0	0	100	0.2	20
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.2	16
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.6	12
Outdoor Recreation	40	0.0	0	80	0.2	16
Commercial Fishing	80	0.6	48	80	0.6	48
Sport Fishing	0	0.0	0	80	0.6	48
Ordinance Disposal Area	100	NA		0		

MP 204 8 60 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.6	60
Unique & Highly Productive Areas	20	0.0	0	100	0.7	70
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.1	8
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.1	8
Commercial Fishing	80	0.6	48	80	1.0	80
Sport Fishing	0	1.0	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

MP 205 9 64 08G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.6	60
Unique & Highly Productive Areas	20	0.0	0	100	0.6	60
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.1	8
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.1	8
Commercial Fishing	80	0.6	48	80	1.0	80
Sport Fishing	0	1.0	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

MPSE 206 21 37 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

MPSE 207 19 34 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.6	48	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.2	0	80		
Ordinance Disposal Area	100	NA		0		

MPSE 208 20 34 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.2	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

MPSE 209 20 37 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.6	48	80		
Sport Fishing	0	0.2	0	80		
Ordinance Disposal Area	100	NA		0		

MPSE 210 27 47 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.2	20
Unique & Highly Productive Areas	20	0.0	0	100	0.2	20
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.2	16
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.5	10
Outdoor Recreation	40	0.0	0	80	0.2	16
Commercial Fishing	80	0.6	48	80	0.5	40
Sport Fishing	0	0.0	0	80	0.5	40
Ordinance Disposal Area	100	NA		0		

MPSE 211 24 64 0

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.2	20
Unique & Highly Productive Areas	20	0.0	0	100	0.2	20
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.2	16	20	0.7	14
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.6	48	80	0.6	48
Sport Fishing	0	0.0	0	80	0.6	48
Ordinance Disposal Area	100	NA		0		

MPSE 212 15 67 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.4	40
Unique & Highly Productive Areas	20	0.0	0	100	0.4	40
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.1	8
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.8	64	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.1	8
Commercial Fishing	80	0.4	32	80	1.0	80
Sport Fishing	0	0.2	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

GB 213 133 210 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.6	48	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

GB 214 132 200 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.6	48	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

GB 215 131 250 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.6	48	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

GB 216 128 225 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

GB 217 126 250 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas*	20	1.0	20	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing *	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

* POSSIBLE FISHING BANK

GB 219 125 200 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.4	8	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

GB 218 125 250 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.4	8	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

GB 220 125 200 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.4	8	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.6	48	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

GB 221 125 200 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.4	8	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.6	48	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

GB 222 118 400 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

GB 223 118 400 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

GB 224 118 400 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

GB 225 124 210 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas * Biota Seaward of	20	1.0	20	100		
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing *	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

* POSSIBLE FISHING BANK

GB 227 121 200 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas * Biota Seaward of	20	1.0	20	100		
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing *	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

* POSSIBLE FISHING BANK

GB 226 123 225 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas * Biota Seaward of	20	1.0	20	100		
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing *	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

* POSSIBLE FISHING BANK

GB 228 120 200 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas * Biota Seaward of	20	1.0	20	100		
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing *	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

* POSSIBLE FISHING BANK

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

GB 229 120 200 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.6	12	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

GB 230 120 400 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

GB 231 119 350 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

GB 232 119 375 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

GB 233 118 375 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

GB 234 118 200 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.8	64	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

GB 235 117 200 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.8	64	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

GB 236 118 300 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.8	64	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

GB 237 118 400 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.6	48	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

GB 238 117 400 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.6	48	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

GB 239 117 300 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.6	48	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

GB 240 120 200 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas *	20	1.0	20	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.6	48	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing *	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

* POSSIBLE FISHING BANK

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

GB 241 120 200 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas *	20	1.0	20	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.6	48	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing *	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

* POSSIBLE FISHING BANK

GB 243 119 200 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas *	20	1.0	20	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.8	64	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing *	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

* POSSIBLE FISHING BANK

GB 242 119 180 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas *	20	1.0	20	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.8	64	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing *	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

* POSSIBLE FISHING BANK

GB 244 118 250 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas *	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

GB 245 117 250 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordnance Disposal Area	100	NA		0		

NO S-1 246 106 400 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas *	20	1.0	20	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing *	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordnance Disposal Area	100	NA		0		

* POSSIBLE FISHING BANK

NOS-1 247 105 400 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.6	12	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordnance Disposal Area	100	NA		0		

NOS-1 248 105 400 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.4	8	100		
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.2	16	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordnance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

NO S-1	249	104	325	G
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SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas *	20	1.0	20	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.6	48	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing *	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

* POSSIBLE FISHING BANK

NO S-1	251	104	325	G
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SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.6	12	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

NO S-1	250	103	325	G
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SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas *	20	1.0	20	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.6	48	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing *	80	0.6	48	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

* POSSIBLE FISHING BANK

NO	252	66	200	G
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SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.6	48	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

NO 253 66 250 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.6	48	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

NO 254 67 170 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

NO 255 69 200 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

NO 256 72 140 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.2	16	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

NO 257 72 160 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100		NCG
Unique & Highly Productive Areas	20	0.0	0	100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40		
Beaches	40	0.0	0	80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20		
Outdoor Recreation	40	0.0	0	80		
Commercial Fishing	80	0.4	32	80		
Sport Fishing	0	0.0	0	80		
Ordinance Disposal Area	100	NA		0		

MS-2 258 52 225 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

MS-2 259 53 310 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

MS-2 260 49 400 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.8	64	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

MS-2 261 50 400 0.6

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

MS-2 262 43 425 0.6

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.1	8
Sport Fishing	0	0.0	0	80	0.1	8
Ordinance Disposal Area	100	NA		0		

MS-2 263 45 500 0.6

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.6	48	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.0	0
Sport Fishing	0	0.0	0	80	0.0	0
Ordinance Disposal Area	100	NA		0		

MS-2 264 33 500 0

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.3	24
Sport Fishing	0	0.0	0	80	0.3	24
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

MS-2 265 31 500 0

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.4	32
Sport Fishing	0	0.0	0	80	0.4	32
Ordinance Disposal Area	100	NA		0		

MS-2 266 38 400 0 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.2	16
Sport Fishing	0	0.0	0	80	0.2	16
Ordinance Disposal Area	100	NA		0		

MS-2 267 37 400 0 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.2	16
Sport Fishing	0	0.0	0	80	0.2	16
Ordinance Disposal Area	100	NA		0		

MS-2 268 31 300 0 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.2	16	20	0.7	14
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.4	32
Sport Fishing	0	0.0	0	80	0.4	32
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

MS-2 269 30 250 0 0 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.6	12
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.4	32
Sport Fishing	0	0.0	0	80	0.4	32
Ordinance Disposal Area	100	NA		0		

MS-2 270 30 275 0 0 G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.0	0	20	0.5	10
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.4	32
Sport Fishing	0	0.0	0	80	0.4	32
Ordinance Disposal Area	100	NA		0		

MS-2 271 36 400 0 0

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.2	16	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.2	16
Sport Fishing	0	0.0	0	80	0.2	16
Ordinance Disposal Area	100	NA		0		

MS-2 272 35 500 0 0

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.3	24
Sport Fishing	0	0.0	0	80	0.3	24
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

MS-2 273 31 200 0

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.4	32
Sport Fishing	0	0.0	0	80	0.4	32
Ordinance Disposal Area	100	NA		0		

MS-2 274 33 200 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	1.0	80	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.3	24
Sport Fishing	0	0.0	0	80	0.3	24
Ordinance Disposal Area	100	NA		0		

MS-2 275 28 180 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.6	48	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.5	40
Sport Fishing	0	0.0	0	80	0.5	40
Ordinance Disposal Area	100	NA		0		

MS-2 276 28 160 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.5	40
Sport Fishing	0	0.0	0	80	0.5	40
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

MS-2 277 27 180 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.2	16	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.5	40
Sport Fishing	0	0.0	0	80	0.5	40
Ordinance Disposal Area	100	NA		0		

MS-2 278 24 180 0

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.6	48
Sport Fishing	0	0.0	0	80	0.6	48
Ordinance Disposal Area	100	NA		0		

MS-2 279 27 180 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.8	64	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.5	40
Sport Fishing	0	0.0	0	80	0.5	40
Ordinance Disposal Area	100	NA		0		

MS-2 280 31 400 0

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of						
Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.2	16	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.4	32
Sport Fishing	0	0.0	0	80	0.4	32
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

MS-2 281 30 200 0

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.4	32
Sport Fishing	0	0.0	0	80	0.4	32
Ordinance Disposal Area	100	NA		0		

MS-2 282 26 120 0/G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.6	48	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.5	40
Sport Fishing	0	0.0	0	80	0.5	40
Ordinance Disposal Area	100	NA		0		

MS-2 283 26 120 0/G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.5	40
Sport Fishing	0	0.0	0	80	0.5	40
Ordinance Disposal Area	100	NA		0		

MS-2 284 31 200 0

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.2	16	20	0.9	18
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.4	32
Sport Fishing	0	0.0	0	80	0.4	32
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

MS-2 285 28 150 0

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.0	0
Unique & Highly Productive Areas	20	0.0	0	100	0.0	0
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.5	40
Sport Fishing	0	0.0	0	80	0.5	40
Ordinance Disposal Area	100	NA		0		

MS-2 286 18 400 0.4G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.4	40
Unique & Highly Productive Areas	20	0.0	0	100	0.4	40
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.2	16	20	0.9	18
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	1.0	80
Sport Fishing	0	0.2	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

MS-2 287 21 500 0.4G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.3	30
Unique & Highly Productive Areas	20	0.0	0	100	0.3	30
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.2	16	20	0.8	16
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.8	64
Sport Fishing	0	0.0	0	80	0.8	64
Ordinance Disposal Area	100	NA		0		

MS-2 288 24 500 0.4G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.2	20
Unique & Highly Productive Areas	20	0.0	0	100	0.2	20
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.2	16	20	0.7	14
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.6	48
Sport Fishing	0	0.0	0	80	0.6	48
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

MS-2 289 17 300 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.4	40
Unique & Highly Productive Areas	20	0.0	0	100	0.4	40
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20	0.9	18
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	1.0	80
Sport Fishing	0	0.2	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

MS-2 290 20 350 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.3	30
Unique & Highly Productive Areas	20	0.0	0	100	0.3	30
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.2	16	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.9	72
Sport Fishing	0	0.2	0	80	0.9	72
Ordinance Disposal Area	100	NA		0		

MS-2 291 24 350 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.3	30
Unique & Highly Productive Areas	20	0.0	0	100	0.3	30
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.2	16	20	0.9	18
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.6	48
Sport Fishing	0	0.0	0	80	0.6	48
Ordinance Disposal Area	100	NA		0		

MS-2 292 16 200 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.5	50
Unique & Highly Productive Areas	20	0.0	0	100	0.5	50
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.6	48	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.1	8
Commercial Fishing	80	0.4	32	80	1.0	80
Sport Fishing	0	0.2	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

ANALYSIS OF POSSIBLE ADVERSE ENVIRONMENTAL IMPACT

MS-2 293 19 250 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.4	40
Unique & Highly Productive Areas	20	0.0	0	100	0.4	40
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	1.0	80
Sport Fishing	0	0.2	0	80	1.0	80
Ordinance Disposal Area	100	NA		0		

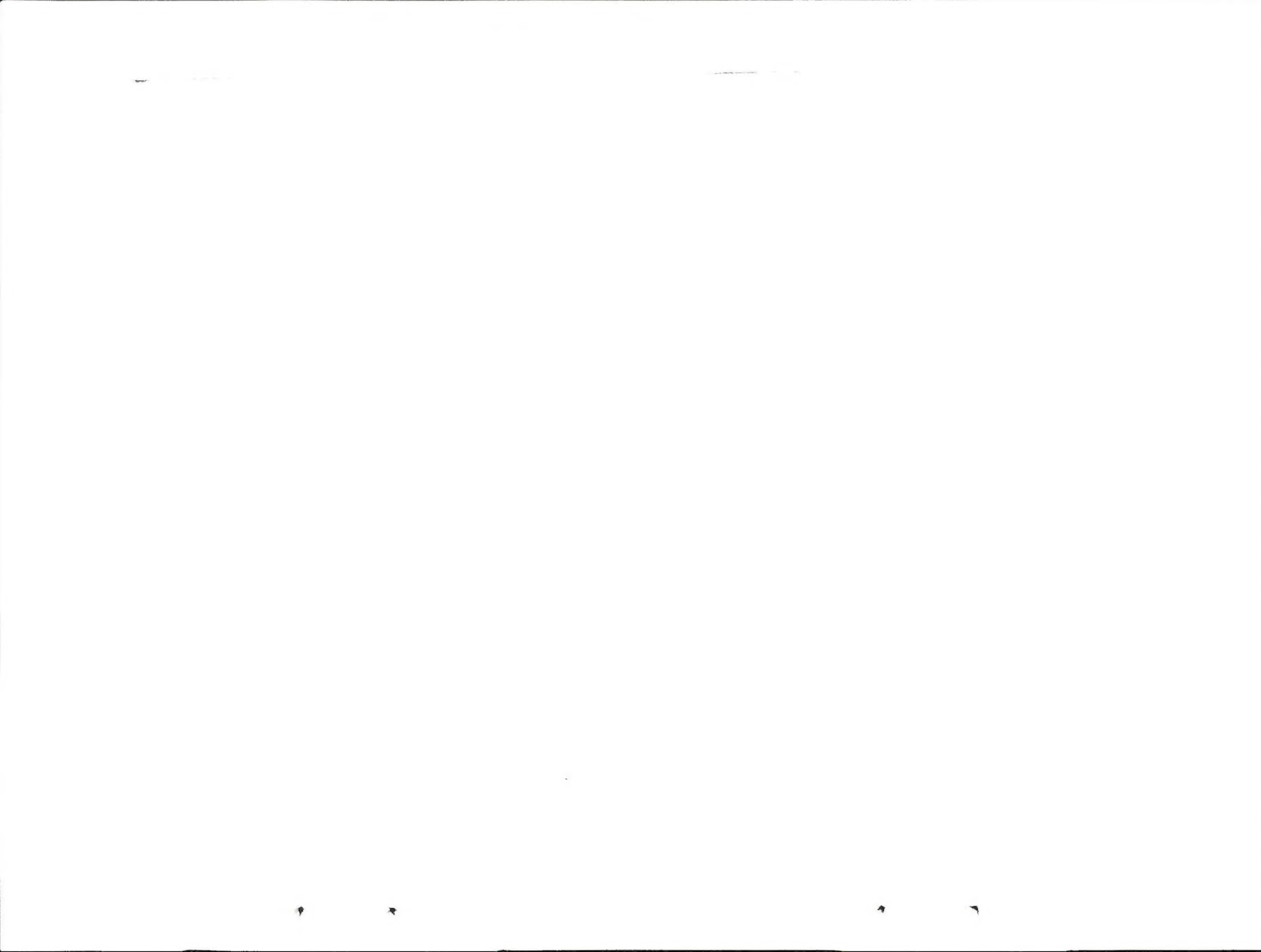
MS-2 294 22 300 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.3	30
Unique & Highly Productive Areas	20	0.0	0	100	0.3	30
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.4	32	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.7	56
Sport Fishing	0	0.0	0	80	0.7	56
Ordinance Disposal Area	100	NA		0		

MS-1 295 20 200 04G

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20	0.0	0	100	0.3	30
Unique & Highly Productive Areas	20	0.0	0	100	0.3	30
Biota Seaward of Estuary/Marsh/Nursery Areas	0	1.0	0	40	1.0	40
Beaches	40	0.0	0	80	0.0	0
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80	0.6	48	20	1.0	20
Outdoor Recreation	40	0.0	0	80	0.0	0
Commercial Fishing	80	0.4	32	80	0.9	72
Sport Fishing	0	0.2	0	80	0.9	72
Ordinance Disposal Area	100	NA		0		

SIGNIFICANT RESOURCE FACTORS	IMPACT FACTORS					
	Structures			Oil Spills (1000 bbl+)		
	IM	PR	F(ST)	IM	PR	F(OS)
<u>Natural Resource Systems:</u>						
Refuges/Management Areas	20			100		
Unique & Highly Productive Areas	20			100		
Biota Seaward of Estuary/Marsh/Nursery Areas	0			40		
Beaches	40			80		
<u>Coastal Activities/Multiple Uses:</u>						
Shipping	80			20		
Outdoor Recreation	40			80		
Commercial Fishing	80			80		
Sport Fishing	0			80		
Ordinance Disposal Area	100			0		



ATTACHMENT I

GEOLOGICAL SURVEY, OCS OIL AND GAS OPERATIONS LEASE
MANAGEMENT PROGRAM

- (1) CODE BOOK
- (2) INSPECTION REPORT
DRILLING
- (3) INSPECTION REPORT
PRODUCTION

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CONSERVATION DIVISION
BRANCH OF OIL AND GAS OPERATIONS
GULF COAST REGION

May 27, 1971

NOTICE TO LESSEES AND OPERATORS OF FEDERAL OIL AND GAS LEASES
IN THE OUTER CONTINENTAL SHELF, GULF COAST REGION

Attached is a copy of the latest working draft of the inspection forms for both drilling and producing operations, as well as the itemized list of potential areas of inspection and the list of actions attendant thereto. This is the latest updating of these forms and instructions and supersedes those given to members of the Offshore Operators Committee in the Director's Office on May 20, 1971. These working draft copies are to be utilized by our personnel from now until they are further modified. Your remarks concerning any needed improvement in these forms or clarification of the itemized list should be addressed to this office whereby we may receive them no later than July 19, 1971.


Robert F. Evans
Regional Oil and Gas Supervisor

Attachments

**GEOLOGICAL SURVEY
CONSERVATION DIVISION
BRANCH OF OIL AND GAS OPERATIONS
GULF COAST REGION**

**OCS LEASE MANAGEMENT PROGRAM
GULF OF MEXICO**

**LIST OF POTENTIAL ITEMS OF NON-COMPLIANCE AND
ENFORCEMENT ACTION**

MAY 1971

PREFACE

This list of potential items of non-compliance (PINC) covers oil and gas operations on the Outer Continental Shelf in the Gulf of Mexico. They are derived from the requirements found in Title 30 of the Code of Federal Regulations and OCS Orders nos. 1-7, dated August 28, 1969 and nos. 8 and 9 dated October 30, 1970. The PINC's are organized more or less chronologically with respect to the usual sequence of events in the exploration and development of oil and gas on an OCS lease. Reference is made in the left-hand margin of the list to the appropriate chapter and paragraph of Title 30 or OCS Order. Each PINC is sequentially numbered for easy reference.

Each specific PINC is presented in the form of a question. If the lease operator has fulfilled the requirement, the question can be answered "yes", and he is in compliance. If the question is answered "no", then an incident of non-compliance exists.

Some of the PINC's include an effective date to be in compliance as a result of time limits specified in OCS Orders 8 and 9. Notes in the right-hand margin of the list should help the inspector locate a particular PINC. The letters to the left of the PINC number indicate the enforcement action to be taken if an incident of non-compliance exists. Specific enforcement action is described beginning on page 194.

GENERAL REQUIREMENTS

The following are general requirements:

Authority

- 250.46 The lessee shall perform all operations in a safe and workmanlike manner.
- 250.45 The lessee shall take all steps necessary to prevent accidents and fires.
- 250.41 The lessee shall take all necessary precautions to keep all wells under control at all times.
- 250.41(a) The lessee shall utilize only personnel trained and competent to drill and operate oil and gas wells.
- 250.41(a) The lessee shall utilize and maintain materials, high pressure fittings and equipment necessary to insure the safety of operating conditions and procedures.
- 7.1.C(3) The operators personnel shall be thoroughly instructed in the technique of equipment maintenance and operation for the prevention of pollution.
- 7.1.C(3) Non-operator personnel shall be informed in writing, prior to executing contracts, of the operator's obligation to prevent pollution.
- 250.43 Discharged wastewater shall not create conditions which will adversely affect public health, or the legitimate use of the waters.
- 250.43 The lessee shall remove any pollutant which threatens aquatic life, public or private property.
- 7.1.C(1) All production facilities shall be such as are necessary to control the maximum anticipated pressures and production.

These general requirements are implemented by the following specific potential items of non-compliance:

GENERAL POLLUTION CONTROL EQUIPMENT AND PROCEDURES

<i>Authority</i>	<i>Enforcement Action</i>		<i>Notes</i>
CONTAINMENT			
7.1.C(2) 8.2.A(3)	W/P(1)	1. Is the platform or fixed or mobile structure equipped with curbs, gutters, and drains in all deck areas in a manner necessary to collect all contaminants, unless drip pans or equivalent are placed under equipment?	Curbs, Gutters, and Drains
7.1.C(2) 8.2.A(3)	P	2. Are all drains piped to a tank or a sump equipped to automatically maintain the oil at a level sufficient to prevent discharge of oil into the Gulf waters or has an alternative method been approved by the Supervisor?	Automatic Sump
8.2.A(3)	P	3. Does the pollution control system prevent spilled oil from flowing into the wellhead area?	Oil in Well- Head Area
DISPOSAL			
250.43(a) 7.1.A(1),(3) 7.1.B(1)	P/Z	4. Is the operator not disposing of oil in any form including drilling mud, drill cuttings, sand and other solids containing oil, into the waters of the Gulf?	Oil Pollution
250.43(a) 7.1.A(3)	Z	5. If the drilling mud contains toxic substances, is it disposed of into the Gulf with neutralization?	Toxic Substances
7.1.A(2)	P/Z	6. Is the operator not disposing of liquid waste materials containing harmful substances into the waters of the Gulf without treatment?	Liquid Waste Pollution
7.1.B(2)	W	7. Are mud containers and other solid waste materials incinerated or transported to shore for disposal?	Solid Waste
INSPECTIONS			
7.2.A(1)	W	8. Are pollution inspections of manned facilities made daily?	Manned Facilities
7.2.A(2)	W	9. Are unattended facilities inspected at frequent intervals?	Unmanned Facilities
SPIILLS			
250.43(a) 7.2.B(1)	W	10. Are all spills or leakage of oil and liquid pollutants recorded by the operator and available for inspection by the Supervisor?	Spill Records
250.43(a)	W	11. Are all spills or leakage of oil, etc., reported orally to the District Engineer without delay?	Oral Reports
250.43(a) 7.2.B(2),(3)	W	12. Are all spill reports of 15 barrels or more confirmed in writing?	Confirma- tion Spill Reports
250.43(a) 7.2.B(3)	W	13. Are all spills or leakage of oil, etc., of more than 50 bbl, and those which cannot be immediately controlled reported orally without delay to the Supervisor, district engineer, Coast Guard, and Regional Director, FWQA (EPA)?	More than 50 bbl. Spills

7.1.C(4)	W	14. Do operators notify each other upon observation of equipment malfunction or pollution resulting from another's operation?	Other Operator's Spills
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CONTINGENCY PLAN AND EQUIPMENT

250.43(a) 7.3.A,B	W	15. Does operator have an emergency plan for controlling and removing pollution filed with the Supervisor which provides for: a. Standby pollution control equipment immediately available to the operator at a land base location? b. Regular inspection and maintenance of such equipment? c. Approval by the Supervisor of such equipment and the land base location and of any changes in equipment and location?	Emergency Plan and Pollution Control Equipment
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SEWAGE DISPOSAL

8.2.A(9)	P(2)	16. Has a sewage disposal system been installed?—Effective 10-30-71	Sewage Disposal
8.2.A(9)	P(2)	17. Does the sewage effluent following treatment contain 50 ppm or less of BOD, 150 ppm or less of suspended solids, and have a minimum chlorine residual of 1.0 mg/liter after a minimum retention time of 15 minutes?—Effective 10-30-71	Effluent Standards

DRILLING OPERATIONS (OFFICE RECORDS)

250.31	W	18. If operations are not conducted by the record owner, has the lessee submitted to the Supervisor a Designation of Operator prior to the operator commencing operations?	Designation of Operator
250.32	W	19. If the Supervisor requested it, did the lessee designate a representative or local agent empowered to receive notices and comply with orders of the Supervisor?	Designation of Representative
250.34(a),(b)	Z	20. Has the lessee submitted to the Supervisor a lease exploratory or development plan for approval prior to commencing operations?	Exploratory/Development Plan
250.34(c) 250.91	Z	21. Has the Application for Permit to Drill been approved prior to commencing operations?	Application for Permit to Drill
250.11 2.0	W	22. If more than five development wells have been drilled in this field, (if there were less than five development wells in the field on August 28, 1969) has the operator applied to the Supervisor to establish field rules?	Field Rules
250.11 250.34(c) 2.0	Z	23. If the Supervisor has issued field rules, is the development well being drilled in accordance with the provisions of the appropriate field rules?	Development Well

250.93	W	24. Has the operator submitted a separate Monthly Report of Operations for the lease beginning with the month in which drilling operations were initiated which includes all the information required by 30 CFR 250.93?	Monthly Report of Operations
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DRILLING OPERATIONS (FIELD INSPECTION)

CASING AND CEMENTING PROGRAM

250.41(a)(1) 2.1.A.,B.,C.,D.	Z	25. Are all casing strings new pipe or equivalent capable of withstanding collapse, bursting, tensile, and other stresses?	New Pipe Requirements
250.41(a)(1) 2.1.A	Z	26. Is the drive or structural casing set in accordance with the requirements of OCS Order No. 2 or field rules?	Drive Casing
250.41(a)(1) 2.1.B(1),(2)	Z	27. Has the following casing been set and cemented in accordance with the requirements of OCS Order No. 2 or field rules? a. Conductor casing. b. Surface casing.	Conductor and Surface Casing
250.41(a)(1) 2.1.B(2)	Z	28. If there were any indications that the surface casing did not cement properly: a. Was a temperature or cement bond survey run? b. Was appropriate remedial action taken?	Bond or Temperature Log
250.41(a)(1) 2.1.C	Z	29. Has the intermediate casing been set properly to cover and isolate all hydrocarbon zones and to isolate abnormal pressure intervals from normal pressure intervals in accordance with OCS Order No. 2 or field rules?	Intermediate Casing
250.41(a)(1) 2.1.D	Z	30. Has the production casing been set and cemented in a manner to isolate all hydrocarbon zones in accordance with OCS Order No 2?	Production Casing
250.41(a)(1) 2.1.D	Z	31. If a liner is used as intermediate or production casing: a. Was the seal pressure tested? b. Was the test recorded in driller's log?	Liner Seal Test
250.41(a)(1) 2.1.E	Z	32. Have all casing strings, except the drive or structural casing, been pressure tested using minimum pressures given in OCS Order No. 2 (or field rules) prior to drilling the plug after cementing?	Pressure Tests
250.41(a)(1) 2.1.E	W	33. Are all casing pressure tests recorded in the driller's log?	Pressure Tests Recorded
250.41(a)(1) 2.1.E	Z	34. Has appropriate remedial action (recementing, repair, etc.) been taken if there was any indication of a leak during the pressure tests?	Remedial Action

250.41(a)(1) 2.1.E	Z	35. Did the operator wait 24 hours after cementing any casing before continuing to drill? (Note: If cementing under pressure, drilling can resume in 8 hours for conductor casing and 12 hours for all other strings)	W.O.C. Time
MUD PROGRAM			
250.41(a)(2) 2.3	Z	36. Are sufficient quantities of mud readily available to insure well control?	Quantity of Mud
250.41(a)(2) 2.3	Z	37. Is the drilling mud program adequate to prevent blowouts?	
250.41(a)(2) 2.3.A	Z	38. Is the mud properly conditioned by circulating from bottom to top with the drill pipe just off the bottom of the hole before starting out of hole?	Mud Control
250.41(a)(2) 2.3.A	Z	39. Is the annulus filled with mud before the mud level drops 100 feet when coming out of the hole with the drill pipe?	Keeping Hole Full
250.41(a)(2) 2.3.A	Z	40. Is a mechanical device for measuring the amount of mud needed to fill the hole used?	Measuring Device
250.41(a)(2) 2.3.A	Z	41. Is the required procedure described in OCS Order 2, Paragraph 3.A followed whenever there is an indication of swabbing or an influx of formation fluids?	Swabbing
250.41(a)(2) 2.3.B	Z	42. Is mud testing equipment maintained on the drilling platform at all times?	Test Equipment
250.41(a)(2) 2.3.B	Z	43. Are mud tests performed daily, or more frequently as conditions warrant?	Mud Tests
250.41(a)(2) 2.3.B	W	44. Are the mud tests recorded in the driller's log?	Records
250.41(a)(2) 2.3.B(1)	Z	45. Is a recording mud pit level indicator installed on the derrick floor and used after setting and cementing conductor casing?	Mud Pit Level Indicator
250.41(a)(2) 2.3.B(1)	Z	46. Is an audio or visual warning device on mud pit level indicator installed on the derrick floor and used after setting and cementing conductor casing?	Warning Device
250.41(a)(2) 2.3.B(2)	Z	47. Is a mud volume measuring device installed on the derrick floor and used after setting and cementing conductor casing?	Mud Vol- ume Measur- ing
250.41(a)(2) 2.3.C	Z	48. Is a mud return indicator installed on the derrick floor and used after setting and cementing conductor casing?	Mud Return Indicator

BLOWOUT PREVENTORS

250.41(a)(3) 2.2.A	Z	49. Before drilling below the conductor casing string, has the operator installed one remotely controlled bag-type blowout preventor and equipment to circulate the drilling fluid to the drilling structure or vessel?	Conductor Casing
250.41(a)(3) 2.2.A	Z	50. Is a large diameter pipe with control valves installed on the conductor casing below the BOP to permit diversion of hydrocarbons and other fluids?	Diverter
250.41(a)(3) 2.2.A	Z	51. If the blowout preventer is on the Gulf floor are the choke and kill lines equipped to permit the diversion of hydrocarbons and other fluids?	Subsea B.O.P.
250.41(a)(3) 2.2.B	Z	52. Before drilling below the surface casing has the operator installed: a. The following remotely controlled, hydraulically operated blowout preventers with a working pressure which exceeds the maximum anticipated surface pressure: i. One bag-type? ii. One equipped with pipe rams? iii. One equipped with blind rams? b. A drilling spool with side outlets if side outlets are not provided in the blowout preventer body? c. A choke line? d. A kill line? e. A fill-up line?	Surface Casing
2.2.C	Z	53. Before drilling below the intermediate casing has the operator installed: a. Four remotely controlled, hydraulically operated blowout preventers with a working pressure which exceeds the maximum anticipated surface pressure including: i. One bag-type? ii. One equipped with pipe rams? iii. One equipped with blind rams? b. A drilling spool with side outlets if side outlets are not provided in the blowout preventer body? c. A choke manifold? d. A kill line? e. A fill-up line?	Interme- diate Casing
250.41(a)(3) 2.2.D	Z	54. Do accumulators or accumulators and pumps maintain a pressure capacity reserve at all times to provide for repeated operation of hydraulic blowout preventors?	Accumu- lator Pressure Capacity
250.41(a)(3) 2.2.E	Z	55. Is a back pressure valve in the open position maintained on the rig floor at all times while drilling (an inside blowout preventor assembly)?	Safety Valves

250.41(a)(3) 2.2.E	Z	56. Is a drill string safety valve in the open position maintained on the rig floor at all times while drilling?	
250.41(a)(3) 2.2.E	Z	57. Is a separate back pressure valve and drill string safety valve maintained in an open position on the rig floor which will fit all pipe in the drill string?	Drill String Valves
250.41(a)(3)	Z	58. Is a kelly cock installed below the swivel, and an essentially full opening kelly cock installed at the bottom of the kelly of such design that it can be run through the blowout preventors?	Kelly Cock
250.41(a)(3) 2.2.D	Z	59. Are the ram-type blowout preventors and related control equipment tested with water to the rated working pressure of the stack or casing (whichever is less) at the following times: a. When installed? b. Before drilling out after setting each casing string? c. Not less than once a week while drilling? d. Following repairs that require disconnecting a pressure seal in the BOP assembly?	Water Test Ram-type BOP
250.41(a)(3) 2.2.D	Z	60. While drill pipe is in use, are the ram-type blowout preventors actuated once each trip and at least once each day?	Operate Ram-type
250.41(a)(3) 2.2.D	Z	61. Is the bag-type blowout preventor water tested to 70 percent of the working pressure of the stack assembly or the casing (whichever is less) at the same times the ram-type BOP is tested?	Water Test Bag-type BOP
250.41(a)(3) 2.2.D	Z	62. Is the bag-type blowout preventor actuated on the drill pipe at least once each week?	Operate Bag-type
250.41(a) 250.41(a)(3) 2.2.D	Z	63. Is a blowout prevention <i>drill</i> held weekly for each drilling crew to insure that all equipment is operating and that the crews are properly trained?	Weekly BOP Drill
250.41(a)(3) 2.2.D	Z	64. a. Are all blowout preventor tests recorded in driller's log? b. Are all blowout preventor drills recorded in driller's log?	BOP Test Records
IDENTIFICATION			
250.37 1.1	W	65. Is the platform or fixed structure identified with signs: a. Located at two diagonal corners of the structure? b. Showing the company name, area, and block number? c. With letters and figures not less than 12 inches high?	Identification of Platform
PERSONAL SAFETY			
250.46 Coast Guard	Z	66. For all personnel on the rig are there sufficient: a. Life jackets? b. Life rafts?	Personal Safety

AUXILIARY POWER SUPPLY

- | | | | |
|----------|---|--|------------------------------|
| 8.2.A(4) | P | 67. Is there an auxiliary electrical power supply installed to provide emergency power capable of operating all electrical equipment required to maintain safety of operation, in the event the primary electrical power supply fails? | Auxiliary
Power
Supply |
|----------|---|--|------------------------------|

ELECTRICAL SYSTEMS

- | | | | |
|-----------------|------|---|----------------------------------|
| 8.2.A(8)(b),(c) | P(2) | 68. Are all electrical generators, motors, and lighting systems installed, protected, and maintained in accordance with the most current edition of the National Electric Code and API RP 500A and B, as appropriate? (Note: Marine-armored cable or metal-clad cable may be substituted for wire in conduit in any area). Effective 10-30-71 | General
Electrical
Systems |
| 8.2.A(8)(a) | P(2) | 69. Are all engines equipped with low-tension ignition systems containing rigid connections and shielded wiring capable of preventing an electrical discharge sufficient to ignite a combustible mixture?—Effective 10-30-71 | Ignition
Systems |

PLATFORMS, WELLS, AND PRODUCTION EQUIPMENT (OFFICE RECORDS)

PLATFORM APPROVALS

- | | | | |
|--------------------|---|--|-----------------------------------|
| 250.19(a)
8.1 | P | 70. Has the operator submitted for approval a design application of a platform, fixed structure, or artificial island which contains all of the items listed in OCS Order No. 8.1, prior to erecting the structure?(Platforms erected or modified after 10-30-70.) | Platform
Design
Application |
| 250.19(a)
8.1.C | P | 71. Are detailed structural plans certified by a registered professional engineer on file and maintained by the operator or his designee?(Platforms erected or modified after 10-30-70) | Structural
Plans
on File |

MULTIPLE COMPLETION

- | | | | |
|--------------------|---|---|-----------------------------------|
| 250.92
6.3.A(1) | Z | 72. Was form 9-331 for multiple completions approved before completing wells? | Form 9-331
Approved |
| 6.3.A(2) | Z | 73. Are multiple completed zones that become intercommunicated immediately repaired to separate the zones after approval is obtained? | Repair
Communic-
ated Zones |

TUBINGLESS COMPLETION

- | | | | |
|----------|---|--|---------------------------------|
| 6.3.B(1) | Z | 74. Are all tubing strings in a multiply completed hole run to the same depth below the deepest producible zone? | Tubing
Strings
Same Depth |
| 6.3.B(2) | Z | 75. Are tubing strings new pipe? | New Pipe |
| 6.3.B(2) | Z | 76. Does cement extend a minimum of 500 feet above the uppermost producible zone? | Cement |

6.3.B(3)	Z	77. Has a temperature or cement bond log been run if lost circulation or other unusual circumstances occurred during cementing operations?	Temperature or Bond Log
250.92 6.3.B(4)	Z	78. Was form 9-331 for tubingless completions approved before completing well?	
250.38(b) 250.95	W	79. Did the operator submit a well completion report together with all required well records within 30 days of completion?	Well Completion Report

SUBSEQUENT WELL OPERATIONS

250.36 250.91 250.92	Z	80. Prior to commencing operations not previously approved such as deepening, plugging-back, repairing, acidizing or stimulating production, perforating, side tracking, squeezing, abandoning, or any similar operation, did the operator submit an application or notice to the Supervisor and obtain approval?	Subsequent Well Operations
250.92(b)	W	81. Did the operator on changing the condition of a well submit a detailed subsequent report of all work done and the results obtained?	Subsequent Report
250.93	W	82. Has the operator submitted a separate Monthly Report of Operations for the lease beginning with the month in which drilling operations were initiated which includes all the information required by 30 CFR 250.93?	Monthly Report of Operations

EQUIPMENT RECORDS

250.19(b) 9.1.A	W	83. Has the operator submitted records semi-annually showing the present status and past history of each control device on all oil and gas pipelines (located on platforms) including dates and details of inspection, testing, repairing, adjustment, and reinstallation?	Pipeline Control Device Records
8.2.A(1)	W	84. Has operator submitted records semi-annually to the Supervisor showing the present status and past history of each manual and automatic shut-in device used on all pressurized vessels and water separation facilities in service?	Shut-in Device Records
8.2.A(2) 5.5	W	85. Has the operator submitted records to the District Office semi-annually showing the present status and past history of each wellhead automatic shut-in device?	Submit Records
8.2.A.(2)(i)	P	86. Has the operator arranged (requested in writing) for a representative of the Geological Survey to witness a complete testing and inspection of the safety system: a. At the time production commenced? b. Within the last six months?	Witnessed Tests

PRODUCED WATER DISPOSAL

- | | | | |
|-------------|---|--|------------------------|
| 8.2.A(5) | W | 87. Is the method and location of wastewater disposal approved by the Supervisor if location is other than into Gulf waters?—Effective 10-30-71 | Other Disposal Methods |
| 8.2.A(5)(b) | W | 88. Are the results of effluent sampling submitted annually to the Supervisor and does the report include dates, time, and location of samples, volumes of waste discharge on dates of sampling in barrels per day, and the results of the specific analysis and physical observations?—Effective 10-30-71 | Annual Report |

FIRE CONTROL SYSTEM

- | | | | |
|-------------|---|---|-------------------------|
| 8.2.A(6)(e) | W | 89. Has a diagram of the firefighting system been submitted to the District Office?—Effective 10-30-71 | Diagram Submitted |
| 8.2.A(6)(c) | W | 90. Are records of the firewater system pump tests submitted semi-annually to the District Office?—Effective 10-30-71 | Semi-annual Test Record |

GAS DETECTION SYSTEM

- | | | | |
|-------------|---|---|-------------|
| 8.2.A(7)(e) | W | 91. Was an application for the installation and maintenance of a gas detection system submitted to the District office for Approval?—Effective 10-30-71 | Application |
|-------------|---|---|-------------|

PLATFORM ABANDONMENT

- | | | | |
|----------|---|--|---------------------|
| 250.18.d | W | 92. Upon termination of the right of use and easement, did lessee remove platform and restore premises to the Supervisor's satisfaction? | Removal of Platform |
|----------|---|--|---------------------|

PLATFORMS, WELLS, AND PRODUCTION EQUIPMENT (FIELD-OPERATIONS)

WELLHEAD AREA

- | | | | |
|-------|---|---|---------------------------|
| 6.1.A | Z | 93. Are all completed wells equipped with casingheads, wellhead fittings, valves, and connections with a rated working pressure equal to or greater than the surface shut-in pressure of the well? | Wellhead Equipment |
| 6.1.A | Z | 94. Are all completed wells equipped with connections and valves designed and installed to permit fluid to be pumped between any 2 strings of casing? | |
| 6.1.A | Z | 95. Are all completed wells with a surface pressure in excess of 5,000 psi equipped with two master valves on the tubing? | Two Master Valves |
| 6.1.A | W | 96. Are all completed wells equipped with wellhead connections assembled and tested prior to installation by a fluid pressure equal to the rated test pressure of the fitting to be installed? | Testing Wellhead Fittings |
| 6.1.B | Z | 97. Are any wells showing sustained pressure on the casinghead, or leaking gas or oil between the production casing and the next larger casing string, tested using the procedure described in OCS Order No. 6.1.B? | Casing Leak Test |

250.37 1.3	W	98. Is each completion individually identified at the wellhead by a legible sign painted on, or affixed to the well showing (1) the OCS lease number and (2) the well number?	Identification at Wellhead
8.2.A(2)(a) 5.5	Z	99. Are all well head assemblies equipped with an operable automatic fail-close valve?	Wellhead Automatic Safety Valve
8.2.A(2)(b)	Z	100. Are all flowlines from wellheads equipped with high-low pressure sensors located close to the wellhead and set to activate the automatic safety valve in the event of abnormal pressures (high or low) in the flowline?	Flowline Sensors
8.2.A(2)(a)	Z	101. Are automatic safety valves temporarily out of service (manually opened) flagged?	Flagged Automatic Safety Valve
8.2.A(2)(g)	Z	102. Is the operation of all automatic well head safety valves tested weekly?	Weekly Tests
8.2.A(2)(g)	Z	103. Is the holding pressure of all automatic well head safety valves tested monthly?	Monthly Tests
8.2.A(2)(g)	W	104. Are the results of all automatic wellhead safety valves tests recorded and maintained in the field?	Test Records
HEADERS AND CHECK VALVES			
8.2.A(2)(c)	Z	105. Are all headers equipped with properly sealing check valves on the individual flowlines?	Check Valves
8.2.A(2)(c)	Z	106. If unprotected by a relief valve with connections to bypass the header, can the flowlines and valves from each well located upstream of and including the header valve, withstand the shut-in pressure of that well?	Flowlines and Valves withstand Shut-in Pressure
8.2.A(2)(h)	Z	107. Is the holding pressure of all check valves tested monthly?	Monthly Check Valve Tests
8.2.A(2)(h)	Z	108. If four consecutive monthly holding pressure tests of check valves are satisfactory to the Supervisor are these tests conducted at least quarterly?	Quarterly Check Valve Tests
8.2.A(2)(h)	W	109. Are the results of all check valve tests recorded and maintained in the field?	Check Valve Test Records
PRODUCTION VESSEL CONTROLS			
8.2A(1)(a)	P(2)	110. Are all separators in service equipped with: a. An operable high-pressure shut-in sensor? b. An operable low pressure shut-in sensor? c. An operable low-level shut-in control? d. An operable relief-valve?	Separators

8.2.A(1)(e)	P(2)	111. Is the high pressure shut-in sensor set no higher than 5 percent below the rated or designed working pressure of the vessel?	High Pilot Setting
8.2.A(1)(e)	P(2)	112. Is the low pressure shut-in sensor set no lower than 10 percent below the lowest pressure in the operating pressure range on all vessels with a rated or designed working pressure of more than 400 PSI?	Low Pilot Setting
8.2.A(1)(e)	P(2)	113. On pressure vessels with a rated or designed working pressure less than 400 PSI is: a. The high-pressure sensor set according to the guidelines for pressure settings on vessels with a designed working pressure greater than 400 PSI, but not within 5 PSI of the vessel's rated working pressure? b. The low-pressure sensor set according to the guidelines for pressure settings on vessels with a designed working pressure greater than 400 PSI, but not lower than 5 PSI below the lowest pressure in the operating range?	Low Pressure Vessel Pilot Settings
8.2.A(2)(c)	P(2)	114. If unprotected by a relief valve with connections to bypass the header, can the inlet valve to a separator, the flowline, and all equipment upstream of the valve, withstand shut-in wellhead pressure?	Inlet Valve
8.2.A(1)(d)	P(2)	115. Are all other hydrocarbon handling pressure vessels unless determined by the Supervisor to be protected in some other way, equipped with: a. An operable high-pressure shut-in sensor? b. An operable low-pressure shut-in sensor? c. An operable high-level shut-in control? d. An operable low-level shut-in control? e. An operable relief valve?	Other Hydrocarbon Pressure Vessels
8.2.A(1)(a)	P(2)	116. Are all pressure vessels that can discharge to a flare equipped with an operable high-level control?	Discharge to Flare
8.2.A(1)(g)	P(2)	117. Are all flare lines equipped with a scrubber or similar separation equipment?	Flare Line Scrubber
8.2.A(1)(b)	P(2)	118. Are all pressure surge tanks equipped with: a. An operable high-pressure shut-in sensor? b. An operable low-pressure shut-in sensor? c. An operable high-level shut-in control? d. An operable relief valve? e. A flare line?	Pressure Surge Tank
8.2.A(1)(c)	P(2)	119. Are all atmospheric surge tanks equipped with an operable high-level shut-in?	Atmospheric Surge Tank

8.2.A(1)(e)	P(2)	120. Are pilot-operated pressure relief valves equipped to permit testing with an external pressure source?	Relief Valves
8.2.A(1)(e)	P(2)	121. Are all spring loaded pressure relief valves: a. Equipped to permit testing with an external pressure source? b. If not so equipped, bench tested?	
8.2.A(1)(e)	P(2)	122. Is pressure relief valve set no higher than the designed working pressure of the vessel?	Relief Valve Settings
PIPELINE CONTROLS ON PLATFORMS			
250.19(b) 9.1.A(1)	PL	123. Are pipelines leaving a platform, receiving production from that platform equipped with: a. An operable high-pressure sensor to directly or indirectly shut-in the platform wells? b. An operable low-pressure sensor to directly or indirectly shut-in the platform wells?	Departing Pipeline
250.19(b) 9.1.A(2)(a)	PL	124. Are pipelines delivering production to production facilities on a platform equipped with an operable automatic shut-in valve connected to the platform's automatic and remote shut-in system?	Incoming Pipelines
250.19(b) 9.1.A(2)(b)	PL	125. Are pipelines coming onto a platform equipped with a check valve?	Pipeline Check Valves
250.19(b) 9.1.A(2)(c)	PL	126. Are pipelines which cross a platform and do not deliver production to the platform, but may or may not receive production from the platform equipped with the following devices to activate an automatic shut-in valve located in the upstream portion of the pipeline at the platform and connected to either the platform automatic and remote shut-in system or to an independent remote shut-in system: a. An operable high-pressure sensor? b. An operable low-pressure sensor?	Crossing Pipelines
250.19(b) 9.1.A(2)(d)	P(2)	127. Are pipeline pumps equipped with: a. An operable high-pressure shut-in device? b. An operable low-pressure shut-in device?	Pipeline Pump Sensors
REMOTE SHUT-IN CONTROLS			
8.2.A(2)(e)	P	128. Are all remote shut-in controls quick-opening valves?	Remote Shut-in Controls
8.2.A(2)(e)	P	129. Are remote shut-in controls located on: a. The helicopter deck? b. All exit stairway landings? c. On each boat landing? d. Others?	Location

SUBSURFACE SAFETY DEVICES

250.41(b) 5.1	Z	130. Are all wells (completions) capable of flowing oil or gas: a. Equipped with an operable subsurface safety device? b. Installed at least 1,000 feet below the Gulf floor?	Subsurface Safety Device
250.41(b) 5.4	Z	131. If any well capable of flowing oil or gas does not have a subsurface safety device, did the operator request and receive approval for a waiver from the requirements of OCS Order No. 5?	Waiver of Safety Device
250.41(b) 5.6	Z	132. If a well is capable of flowing oil or gas, but is not equipped with a subsurface safety device, is a subsurface safety device available at the field location for use in the event of an emergency?	Availability of Sub- surface Safety Device
250.41(b) 5.2	Z	133. Has the subsurface safety device which is an integral part of the tubing string been tested at intervals not exceeding six months and replaced or a removable subsurface safety device installed if the test was unsatisfactory?	Integral Part of Tubing Device
250.41(b) 5.3	Z	134. If well was completed after August 28, 1969, is the tubing string equipped with a landing nipple to provide for setting a subsurface safety device?	Landing Nipple Installation
250.41(b) 5.3	Z	135. If the well has a high-flow rate or if it produces sand, are areas of turbulence above and below the subsurface safety device protected by a flow coupling or other protective equipment? (For tubing installations after 8-28-69)	Turbulence near Safety Valve
250.41(b) 5.2	Z	136. Has the subsurface safety device been removed and inspected and maintenance performed as indicated at not more than six month intervals or (for a device set in landing nipple) at not more than 12 month intervals?	Inspection of Subsur- face Safety Device
250.38(a) 5.8	W	137. Are records available (in the field) showing the present status and past history of each subsurface device including dates and details of inspection, testing, repairing, adjustment, and reinstallation?	Records Available in Field

IDENTIFICATION AND OTHER SAFETY EQUIPMENT

250.37 1.1	W	138. Is the platform or large fixed structure identified with signs: a. Located at two diagonal corners of the structure? b. Showing the company name, area, block number, and structure designation? c. With letters 196, and figures not less than 12 inches high?	Identifica- tion of
250.37 1.2	W	139. Is the single well or small structure identified with: a. At least one sign showing the company name, area, block number, and structure designation? b. Letters and figures not less than 3 inches high?	Identifica- tion of Single Well or Small Structure

250.46 Coast Guard	P	140. For all personnel on the platform are there sufficient: a. Life jackets? b. Life rafts (on manned platforms)?	Personnel Safety
8.2.A(2)(d)	P(2)	141. Are all pneumatic shut-in control lines equipped with fusible material at strategic points?	Fusible Material
8.2.A(2)(j)	W	142. Has a standard procedure for testing safety equipment been prepared and posted in a prominent place on the platform?	Test Procedure Posted
AUXILIARY POWER SUPPLY			
8.2.A(4)	P	143. Is there an auxiliary electrical power supply installed to provide emergency power capable of operating all electrical equipment required to maintain safety of operation, in the event the primary electrical power supply fails?	Auxiliary Power Supply
ELECTRICAL SYSTEMS			
8.2.A(8)(b),(c)	P(2)	144. Are all electrical generators, motors, and lighting systems installed, protected, and maintained in accordance with the most current edition of the National Electric Code and API RP 500A and B, as appropriate? (Note: Marine-armored cable or metal-clad cable may be substituted for wire in conduit in any area).—Effective 10-30-71.	General Electrical Systems
8.2.A(8)(a)	P(2)	145. Are all engines equipped with low-tension ignition systems containing rigid connections and shielded wiring capable of preventing an electrical discharge sufficient to ignite a combustible mixture? (Not applicable to diesel engines)—Effective 10-30-71	Ignition Systems
PRESSURE SENSOR TESTING			
8.2.A(1)(f)	P(2)	146. Are all pressure sensors equipped to permit testing with an external pressure source?	Pressure Sensors
8.2.A(1)(f)	P(2)	147. Have all pressure sensors been tested for proper pressure settings monthly: a. On flowlines? b. On pressure vessels?	Pressure Sensor Tests
8.2.A(2)(f)	P(2)	148. If four consecutive monthly pressure sensor tests are consistent to the satisfaction of the Supervisor are pressure sensor tests being conducted quarterly: a. On flowlines? b. On pressure vessels?	
8.8.A(2)(f)	W	149. Are the results of all pressure sensor tests recorded and maintained in the field?	Pressure Sensor Test Records

FIRE CONTROL SYSTEM

8.2.A(6)(e)	W	150. Is a diagram of the firefighting system, which shows the location of all equipment, posted on a prominent place on the platform?—Effective 10-30-71	Diagram Posted
250.46 8.2.A(6)(d) Coast Guard	P	151. Are portable fire extinguishers located in the living quarters and in other strategic areas?—Effective 10-30-71	Fire Extinguishers
8.2.A(6)(a)	P	152. Is a fixed automatic water spray system installed in all inadequately ventilated well head areas as these areas are defined in paragraph 9 of API RP 500A and in accordance with the most current edition of <i>National Fire Protection Association's Pamphlet No. 15</i> ?—Effective 10-30-71	Water Spray System in Wellhead Area
8.2.A(6)(b)	P	153. Is a firewater (or chemical) system of rigid pipe with fire hose stations installed to provide protection in areas where production handling equipment is located?—Effective 10-30-71	Fire Water System
8.2.A(6)(c)	P	154. Is there an alternate fuel or power source installed to provide continued pump operation during platform shut down unless an alternative firefighting system is provided?—Effective 10-30-71	Alternate Source or System
8.2.A(6)(c)	P	155. Are firewater systems pumps inspected and test-operated weekly?—Effective 10-30-71	Pump Inspections
8.2.A(6)(c)	W	156. Are records of the firewater system pump tests maintained in the field?—Effective 10-30-71	Field Records

GAS DETECTION SYSTEM

8.2.A(7)(f)	W	157. Is a diagram of all gas detection systems showing the location of all gas detection points posted in a prominent place on the platform?—Effective 10-30-71	Diagram Posted
8.2.A(7)(a)	P	158. Are gas detection systems located in all enclosed areas containing gas handling facilities or equipment and in other areas which are classified as hazardous areas as defined in API RP 500 and the <i>National Electric Code</i> ?—Effective 10-30-71	Location
8.2.A(7)(b)	P	159. Are all gas detection systems capable of continuously monitoring for the presence of combustible gas in the areas in which they are located?—Effective 10-31-71	Detection Capability
8.2.A(7)(c)	P	160. Does the gas detection system sound an alarm at some point below the lower explosive limit of 1.3 percent as shown in <i>Bureau of Mines Bulletin No. 503</i> ?—Effective 10-30-71	Alarm Level
8.2.A(7)(d)	P	161. Does the gas detection system trigger shut-in sequences and operate emergency equipment before the level exceeds 4.9 percent?—Effective 10-30-71	Shut-in Level

PRODUCED WATER DISPOSAL

8.2.A(5)(b)	P(2)	162. Is the oil content of the disposed water reduced to an average of not more than 50 parts per million?—Effective 10-30-71	Average Oil Content
8.2.A(5)(b)	P(2)	163. Is the wastewater system maintained in such a manner as to prevent the discharge of an effluent containing in excess of 100 ppm of total oil content?—Effective 10-30-71	Maximum Allowable Oil Content
8.2.A(5)(b)	P(2)	164. Is there a point prior to discharge into the receiving waters where a representative sample of the treated effluent can be obtained?—Effective 10-30-71	Sampling Station
8.2.A(5)(b)	P(2)	165. Are four effluent samples taken within a 24-hour period once a month and have the following determinations been made: Temperature, suspended solids, settleable solids, PH, total oil content, and volume obtained?—Effective 10-30-71	Monthly Samples
8.2.A(5)(b)	P(2)	166. Are samples taken and analyses performed in accordance with the American Society for Testing and Materials test D1340, "Oily Matter in Industrial Waste Water" or has the Supervisor approved an alternate method?—Effective 10-30-71	Method of Testing

PIPELINES (OFFICE RECORDS)

250.19(b) 9.2	W	167. Has the operator submitted for the Supervisor's approval, an application in duplicate, with drawings, plans, etc. as outlined in OCS Order No. 9.2 prior to installation?	Pipeline Application
250.19(b) 9.1.D	PL(2)	168. Is pipeline hydro-tested to 1.25 times the designed working pressure for a minimum of two hours prior to use?	Testing
250.19(b) 9.3	W	169. Has the operator notified the Supervisor after completion of installation of pipelines and submitted diagrams, drawings, and the records of the original hydrostatic pressure test as outlined in OCS Order No. 9.3?	Notification of Installation
250.19(b) 9.1.E	W	170. Are monthly inspection records maintained including dates, methods, and results for all inspections and submitted annually by April 1 to the Supervisor?	Records

PIPELINES (FIELD OPERATIONS)

250.19(b) 9.1.B	PL(2)	171. Is pipeline protected from loss of metal due to corrosion that would endanger the strength and safety of the lines, by extra thickness of metal, protective coating or cathodic protection?	Corrosion Protection
250.19(b) 9.1.C	PL(2)	172. Is pipeline installed in such a manner as to be compatible with trawling operations and other OCS users?	Other OCS Users
250.19 9.1.E	PL(2)	173. Is pipeline inspected for leaks at least monthly?	Inspection

250.19(b) 9.1.E	W	174. Are reports indicating the cause, effect, and remedial action taken regarding all leaks submitted to the Supervisor within one week following the occurrence of leaks?	Reporting Leaks
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ABANDONMENT

250.44 250.92(c)	R	175. Did the operator submit a detailed statement of the proposed work for abandonment of any well; provide the information specified in 30 CFR 250.92(c), and obtain approval prior to commencing operations?	Notice of Intent to Abandon
250.15 250.44 3.1.A	R(3)	176. Are all cement plugs spaced to extend 100 feet below the bottom to 100 feet above the top of any oil, gas, and fresh water zones in uncased portions of the well?	Spacing of Plugs
250.15 250.44 3.1.B.	R(3)	177. Is a cement plug placed in the deepest casing string (where there is open hole below the casing) as specified in OCS Order No. 3.1.B(1),(2), or (3)?	Isolation of Open Hole
250.15 250.44 3.1.B(3)	R(3)	178. Is the bridge plug set as specified in OCS Order No. 3.1.B(3) tested prior to placing subsequent plugs?	Testing Bridge Plug
250.15 250.44 3.1.C.	R(3)	179. Are perforated intervals plugged or isolated as specified in OCS Order No. 3.1.C?	Plugging Perforations
250.15 250.44 3.1.D	R(3)	180. Are all casing stubs plugged as specified in OCS Order No. 3.1.D.	Plugging of Casing Stubs
250.15 250.44 3.1.E.	R(3)	181. Is any annular space, extending to the Gulf floor and open to drilled hole below, plugged with cement?	Plugging of Annular Space
250.15 250.44 3.1.F.	R(3)	182. Is the surface plug of at least 150 feet, with the top plug within 150 feet of the Gulf floor, and in the smallest string of casing extending to the surface?	Surface Plug
250.15 250.44 3.1.G	R(3)	183. Is the first plug below the top 150 foot plug tested as specified in OCS Order No. 3.1.G?	Testing Plugs
250.15 250.44 3.1.H	R(3)	184. Do each of the hole intervals between plugs contain mud fluid of sufficient density?	Mud
250.15 250.44 3.2	R(3)	185. Are temporarily abandoned drilling wells plugged in accordance with OCS Order 3.2?	Temporarily Abandoned Wells
250.15 250.44 3.1.I	W	186. Have all casing and piling been severed and removed to at least 15 feet below the Gulf floor?	Casing Removal
250.15 250.44 3.1.I	W	187. Has the location been dragged to clear the well site of any obstructions?	Removal of Obstructions

250.92(d)	W	188. Did the operator submit a detailed report of the manner in which the abandonment was accomplished?	Subsequent Report
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NOTIFICATION OF ACCIDENTS AND FIRES

250.45	W(4)	189. Has the Supervisor been notified immediately of all serious accidents and all fires?	Immediate Notification
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250.45	W	190. Has a full written report been submitted within ten days?	Written Report
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250.45	W	191. Has the Supervisor been notified of any other unusual condition, problem, or malfunction within 24 hours?	Other Unusual Conditions
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ENFORCEMENT POLICY

OBJECTIVES

The adoption of the enforcement policy outlined below has the following objectives:

1. To reduce the incidents of noncompliance leading to loss of life, property, and damage to the environment.
2. To establish a uniform enforcement policy to be applied to all operations affecting OCS lands in the Gulf of Mexico.

The following paragraphs describe the various enforcement actions and provide criteria for selecting them.

ENFORCEMENT ACTION

Each inspection of a lessee's field operations and records may result in the detection of incidents of noncompliance (INCs). Specific INCs will require specific actions (see Table 1). All INCs detected during an inspection will be discussed orally with the lessee's representative and reported to the lessee in writing.

FIELD PROCEDURE

1. No INC's are detected. — No action needs to be taken.
2. INC's are detected. — If any INC's are detected, the inspection team leader will orally advise the company representative of the specific problems encountered and issue a written warning on Experimental Form OCS-4.
3. Special action required. — The specific enforcement action to be taken for each INC detected is listed in Table 1. If a shut-in of a producing zone, platform, pipeline etc., is called for, the inspection team leader will contact the District Engineer and describe the facility's condition and the implications of the shut-in. The District Engineer will authorize the shut-in action prescribed in Table 1. If the District Engineer cannot be contacted because of communication problems, the inspector will take the appropriate action indicated in Table 1 and notify the District Engineer as soon as possible.

The inspection team leader will provide the company representative with written orders to shut-in the zone(s), platform, facility, etc., on Experimental Form OCS-4 after explaining orally the reason for the shut-in. The inspector will make it clear to the company representative that the facility cannot be returned to operation until the site has been reinspected and the company has received clearance from the District Engineer to do so. If the inspector conducting the reinspection cannot contact the District Engineer because of communication problems he may authorize the resumption of operations and will notify the District Engineer as soon as possible thereafter. Any waiver of the reinspection procedure must be given by the Regional Supervisor.

OFFICE PROCEDURE

1. Warning(s) issued by inspector. — The written warning given to the company representative by the inspector must be returned to the District Engineer within 7 days and certified that all incidents of noncompliance have been corrected.
 - a. Warning form not returned within 7 days. — The District Engineer will orally notify the company, and confirm in writing, to shut in the equipment involved, if it is an operating item, the District Engineer will forward the warning notice to the Regional Supervisor with the recommendation that the company should be fined for all INCs detected and failure to comply with the warning notice.
 - b. Company requests an extension of time. — The District Engineer is authorized to grant a 7-day extension for the return of Experimental Form OCS-4 if the company requests it. The extension will be confirmed in writing and a copy will be sent to the Regional Supervisor. If the company still fails to return the Form, the District Engineer will take the action described in paragraph 1a.

2. Shut-in of facility. — As soon as the inspector reports a shut-in, the District Engineer will notify the company of the action in writing and instruct them not to resume operations until the field site has been reinspected. The confirmation of the shut-in action will also instruct the company to inform the District Engineer when they are ready for reinspection. In any event, the certification of compliance (Experimental Form OCS-4) must be returned to the District Engineer within 7 days.
 - a. Company fails to request reinspection and to certify compliance within 7 days. — District Engineer will transmit copies of Experimental Form OCS-4 and the confirmation of shut-in to the Regional Supervisor with a recommendation to fine the company for the INCs detected during inspection and for not complying with the District Engineer's orders.
 - b. Company requests reinspection within 7 days. — The District Engineer will attempt to schedule a reinspection as soon as the existing workload permits. The inspector will inspect the site, and if all INCs have been corrected and no new INCs are detected the District Engineer will authorize the company to resume operations. If the order is given orally, the District Engineer will confirm it in writing.
 - c. Company requests waiver of reinspection. — If the company feels that it cannot wait for the reinspection, they may request a waiver of the requirement from the Regional Supervisor provided that they first have returned Experimental Form OCS-4 certifying that all INCs have been corrected.
3. Shut-in of drilling wells. — If an inspector shuts-in a drilling well, the District Engineer will notify the company of the action in writing. In order to minimize the dangers of maintaining an open hole, the inspector will remain at the drilling site or return to it as soon as the INC has been corrected to reinspect and pick up the certification of compliance from the company. Orders from the District Engineer to resume operations will be passed orally with written confirmation.
4. Subsurface safety valves. — If the inspection reveals that there is no subsurface safety valve installed, and no waiver has been granted, the District Engineer will notify the Regional Supervisor, in writing, with recommendation for fine(s). The Supervisor will transmit this recommendation with his comments to Washington. Washington will recommend the fine(s) to the Justice Department.

Table 1.—Action required for OCS incidents of noncompliance action detected

[The following incidents of noncompliance have been identified as requiring specific enforcement action]

INC No.	Action	INC No.	Action	INC No.	Action	INC No.	Action
1	W/P(1)	49	Z	97	Z	145	P(2)
2	P	50	Z	98	W	146	P(2)
3	P	51	Z	99	Z	147	P(2)
4	P/Z	52	Z	100	Z	148	P(2)
5	Z	53	Z	101	Z	149	W
6	P/Z	54	Z	102	Z	150	W
7	W	55	Z	103	Z	151	P
8	W	56	Z	104	W	152	P
9	W	57	Z	105	Z	153	P
10	W	58	Z	106	Z	154	P
11	W	59	Z	107	Z	155	P
12	W	60	Z	108	Z	156	W
13	W	61	Z	109	W	157	W
14	W	62	Z	110	P(2)	158	P
15	W	63	Z	111	P(2)	159	P
16	P(2)	64	Z	112	P(2)	160	P
17	P(2)	65	W	113	P(2)	161	P
18	W	66	Z	114	P(2)	162	P(2)
19	W	67	P	115	P(2)	163	P(2)
20	Z	68	P(2)	116	P(2)	164	P(2)
21	Z	69	P(2)	117	P(2)	165	P(2)
22	W	70	P	118	P(2)	166	P(2)
23	Z	71	P	119	P(2)	167	W
24	W	72	Z	120	P(2)	168	PL(2)
25	Z	73	Z	121	P(2)	169	W
26	Z	74	Z	122	P(2)	170	W
27	Z	75	Z	123	PL	171	PL(2)
28	Z	76	Z	124	PL	172	PL(2)
29	Z	77	Z	125	PL	173	PL(2)
30	Z	78	Z	126	PL	174	W
31	Z	79	W	127	P(2)	175	R
32	Z	80	Z	128	P	176	R(3)
33	W	81	W	129	P	177	R(3)
34	Z	82	W	130	Z	178	R(3)
35	Z	83	W	131	Z	179	R(3)
36	Z	84	W	132	Z	180	R(3)
37	Z	85	W	133	Z	181	R(3)
38	Z	86	P	134	Z	182	R(3)
39	Z	87	W	135	Z	183	R(3)
40	Z	88	W	136	Z	184	R(3)
41	Z	89	W	137	W	185	R(3)
42	Z	90	W	138	W	186	W
43	Z	91	W	139	W	187	W
44	W	92	W	140	P	188	W
45	Z	93	Z	141	P(2)	189	W(4)
46	Z	94	Z	142	W	190	W
47	Z	95	Z	143	P	191	W
48	Z	96	W	144	P(2)		

ACTION CODE

W -- Written Warning --- Operator is notified of INC and required to make necessary changes within 7 days to comply with applicable Regulation or OCS Order.

P -- platform shut-in

Z -- zone (well) shut-in

R -- re-enter well at Survey request

PL -- pipeline shut-in

NOTES ON ENFORCEMENT ACTION

1. Warning if pollution is not present, platform shut-in if pollution exists.
2. Only that equipment on which INC's occur will be shut-in (zones, wells, pipelines, vessels, etc.)
3. If INC is detected District Engineer will require well to be re-entered, plugs drilled out and the well replugged in conformance with approved procedures and action witnessed by a Survey representative. A waiver of this requirement must be approved by the Regional Oil and Gas Supervisor.
4. If this violation is detected the District Engineer will notify the Supervisor with a recommendation for fine(s), for transmittal to Washington for action.

RMP. FORM (OCS-2)
REV. 1973

U. S. GEOLOGICAL SURVEY
CONSERVATION DIVISION
BRANCH OF OIL AND GAS OPERATIONS
OCS LEASE MANAGEMENT PROGRAM
INSPECTION REPORT
DRILLING
DISTRICT _____

LEASE NO. _____
WELL NO. _____
DATE. _____

AREA: _____ BLOCK: _____ OPERATOR: _____
DRILLING CONTRACTOR: _____ CO. REPRESENTATIVE: _____
RIG NAME: _____ WATER DEPTH: _____ TOOL PUSHER: _____
DRILLING DEPTH: _____ APPROVED DEPTH: _____ WELL STAGE: _____
DATE LAST DETAILED USGS INSPECTION: _____

TYPE FACILITY:	
Drillship	
Platform	
Platform w/Tender	
Self Elevating	
Submersible	
Semi-submersible	

TIME SUMMARY:
INSPECTION: _____ HRS.
WAITING: _____ HRS.
TRAVEL: _____ HRS.
TOTAL TIME: _____ HRS.
Ave. No. Personnel _____
Max. No. Personnel _____

RIGS SHUT-DOWN

<u>INC. NO.</u>	<u>DATE & TIME SHUT-DOWN</u>	<u>DATE & TIME RESUMED OPERATIONS</u>	<u>HOURS SHUT-DOWN</u>	<u>REMARKS</u>
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

APPROVED DEPARTURES

<u>PINC. NO.</u>	<u>DATE ISSUED</u>	<u>REMARKS</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

REMARKS

GENERAL HOUSEKEEPING CONDITIONS:

SIGNATURE OF INSPECTORS

Rev.

LEASE NO. _____

DATE: _____

Safety	ENF. ACT.	PINC. NO.	POTENTIAL INCIDENT OF NON-COMPLIANCE						CODE NO.
	W	65	Is rig or platform properly identified?	#chk	1	Y	N	NA	352
	W	66	For all personnel on the rig are there sufficient: Life jackets and Life rafts? (maximum number of personnel).	#chk	1	Y	N	NA	23

Power System	NUMBER OF GENERATORS, MOTORS, LIGHTING SYSTEMS					TOTAL			
	Z	68	Are electrical generators, motors, lighting system installed, protected, maintained in accordance with National Electrical Code, API RP 500A-B?	#chk	1	Y	N	NA	33

Pollution Control	W/Z	1	Is facility equipped with necessary curbs, gutters and drains or drip pans?	#chk	1	Y	N	NA	39
	Z	2	Are all drains piped to a tank or sump which will maintain oil at a level to prevent discharge into the Gulf waters, or has an alternate method been approved?	#chk	1	Y	N	NA	334
	Z	4	Is operator not disposing of oil, oily solids, or drilling mud containing oil into the waters of the Gulf?	#chk	1	Y	N	NA	336
	Z	5	Is operator not disposing of drilling mud containing toxic substances into Gulf waters without neutralization?	#chk	1	Y	N	NA	50
	Z	6	Is operator not disposing of liquid waste materials containing harmful substances into Gulf waters without neutralization?	#chk	1	Y	N	NA	338
	W	7	Are solid waste materials incinerated or transported to shore? (underline method)	#chk	1	Y	N	NA	53
	W	8	Is pollution inspection made daily?	#chk	1	Y	N	NA	55
	W	14	Do operators notify each other upon observation of equipment malfunction or pollution resulting from another's operation?	#chk	1	Y	N	NA	
	W	10	Are spills and leaks recorded and records available for inspection?	#chk	1	Y	N	NA	58
	Z	16	Is sewage disposal system installed?	#chk	1	Y	N	NA	27
	W/Z	17	Does effluent contain 50 PPM or less of BOD, 150 PPM or less of suspended solids, minimum chlorine residual of 1.0 mg/liter after minimum retention time of 15 minutes?	#chk	1	Y	N	NA	29

REMARKS

Rev.

LEASE NO. _____

DATE: _____

Casing Program	Size Hole	Casing					W/ Sx. Cem.	Bond Log ?	Rem. Act. ?	Press. PSI	Test Time	WOC Time
		Size	Grade	wt/ft	w/press.	set at						
Dr./Struc.	X		X		X		X	X	X	X	X	X
Cond.												
Sur.												
Inter.												
Prod.												
Liner												

Drilling Program	APPROVED - FROM DISTRICT FILE							
	Size Hole	Size	Grade	wt/ft.	w/press.	Set at	Sx. Cement	
Dr./Struc.	X		X		X		X	
Cond.								
Sur.								
Inter.								
Prod.								
Liner								

Casing Program	ENF. ACT. NO.	INC. NO.	POTENTIAL INCIDENT OF NON-COMPLIANCE						CODE NO.
Z	28		Was appropriate remedial action taken, if surface casing did not cement properly?	#chk	1	Y	N	NA	88
Z	31		Was liner seal pressure tested and recorded in log?	#chk	1	Y	N	NA	91
Z	32		Have casing strings been pressure tested?	#chk	1	Y	N	NA	93
Z	33		Was test recorded in driller's log?	#chk	1	Y	N	NA	95
Z	34		Was remedial action taken if needed?	#chk	1	Y	N	NA	96
Z	35		Was there proper WOC time before drilling out?	#chk	1	Y	N	NA	97

Z	36		Are sufficient quantities of mud available?	#chk	1	Y	N	NA	98
Z	38		Is mud properly conditioned before starting out of hole?	#chk	1	Y	N	NA	100
Z	39		Is annulus filled before mud level drops 100'?	#chk	1	Y	N	NA	101
Z	40		Is mechanical device used to measure mud to fill hole?	#chk	1	Y	N	NA	102
Z	41		Was procedure in OCS Order 2 used if swabbing of fluid influx indicated?	#chk	1	Y	N	NA	103

LAST TIME EVENT OCCURRED? WHAT OCCURRED?									
RECORDED IN LOG? DEPTH?									
Z	42		Is mud testing equipment on platform?	#chk	1	Y	N	NA	104
Z	43		Are mud tests performed daily, or as warranted?	#chk	1	Y	N	NA	105

Mud Program	FROM FIELD INFORMATION				APPROVED - FROM FILE		
	Depth	Mud Weight	Viscosity	Type/Base	Mud Weight	Viscosity	Type/Base
Z	44						
Z	45						
Z	46						
Z	48						

Z	44		Are mud tests recorded in log?	#chk	1	Y	N	NA	106
Z	45		Is recording mud pit level indicator installed and used?	#chk	1	Y	N	NA	349
Z	46		Is audio or visual warning on pit level indicator installed and used?	#chk	1	Y	N	NA	350
Z	48		Is mud return indicator installed and used?	#chk	1	Y	N	NA	352

Rev.

LEASE NO. _____
DATE: _____BOP REQUIREMENTS

ENF. ACT.	INC. NO.	POTENTIAL INCIDENT OF NON-COMPLIANCE	#chk	Y	N	NA	CODE NO.	
Z	195	Is hydraulically controlled bag-type BOP installed on drive pipe if conductor casing is to be eliminated?	#chk	1	Y	N	NA	
Z	49	Is hydraulically controlled bag-type BOP installed on conductor casing?	#chk	1	Y	N	NA	115
Z	50	Are diverter valves on conductor casing below BOP?	#chk	1	Y	N	NA	116
Z	52a	Are remotely controlled, hydraulically operated blowout preventers installed?	#chk		Y	N	NA	117
Z	53a		#chk		Y	N	NA	122
Z	52c	Is choke line installed?	#chk		Y	N	NA	119
Z	53c		#chk		Y	N	NA	124
Z	52d	Is kill line installed?	#chk		Y	N	NA	120
Z	53d		#chk		Y	N	NA	125
Z	52e	Is fill-up line installed?	#chk		Y	N	NA	121
Z	53e		#chk		Y	N	NA	126
Z	51	If the BOP is on the Gulf floor, are the choke and kill lines equipped to permit the diversion of hydrocarbons and other fluids?	#chk		Y	N	NA	
WP OF STACK DATE OF LAST TEST TESTED TO								
Z	61	Is the bag-type blow-out preventer tested with water to 70% of WP of stack or casing?	#chk	1	Y	N	NA	358
Z	62	Is the bag-type blow-out preventer actuated on drill pipe weekly?	#chk	1	Y	N	NA	147
W	64a	Is test information for all blow-out preventer tests recorded in driller's log?	#chk	1	Y	N	NA	149
Z	59a	Is BOP tested with water to WP of stack or casing: when initially installed?	#chk		Y	N	NA	140
Z	59b	before drilling out on succeeding casing strings?	#chk		Y	N	NA	141
Z	59c	not less than once each week?	#chk		Y	N	NA	142
Z	59d	following repairs?	#chk		Y	N	NA	143
Z	60	Are piprams actuated each trip, at least daily?	#chk		Y	N	NA	144
Z	196	Are blind rams actuated each trip?	#chk		Y	N	NA	
Z	54	Are there accumulators or accumulators and pumps to repeatedly operate BOP?	#chk	1	Y	N	NA	127
DIFFERENT SIZE(S) OF DRILL PIPE								
Z	57	Are inside BOP assembly and drill string safety valves to fit all sizes of pipe maintained in the open position on the rig floor?	#chk		Y	N	NA	356
Z	58	Is Kelly Cock installed below swivel and full opening safety valve installed at bottom of Kelly?	#chk	2	Y	N	NA	357
KELLY COCK WRENCH? Y N WHERE LOCATED?								
Z	63	Is BOP drill conducted weekly for each crew?	#chk		Y	N	NA	148
W	64b	Is drill recorded in log?	#chk		Y	N	NA	360

LEASE NO: _____
DATE: _____

TIME SUMMARY

INSPECTION:	_____	HRS.
WAITING:	_____	HRS.
TRAVEL:	_____	HRS.
TOTAL TIME:	_____	HRS.

WELL STATUS:

POW	_____	PGW
OSI	_____	GSI

OTHER (SPECIFY) _____

DATE LAST DETAILED USGS INSP. _____

DATE REINSPECTED: _____

[illegible][illegible]

GENERAL HOUSEKEEPING CONDITIONS:

SIGNATURE OF INSPECTORS

PART I - GENERAL

ENF. ACT.	INC. NO.	POTENTIAL INCIDENT OF NON-COMPLIANCE	#chk	Y	N	NA	CODE NO.	
W	139	Is structure properly identified?	#chk	1	Y	N	NA	406
P	140a	For all personnel on the platform are there sufficient Life jackets? (# persons on board at time of inspect.)	#chk	1	Y	N	NA	24
P	140b	Life rafts? (on manned platform) (# persons on board at time of inspection) No. and size:	#chk	1	Y	N	NA	26
P	143	Is there an auxiliary electrical power supply?	#chk	1	Y	N	NA	32
NUMBER OF GENERATORS, ELECTRICAL MOTORS, LIGHTING SYSTEMS								TOTAL:
P(2)	144	Are electrical generators, motors, lighting system installed, protected, maintained in accordance with National Electrical Code, API RP 500A-B?	#chk	1	Y	N	NA	34
P(2)	145	Are gas engines equipped with low-tension ignition systems, rigid connections, shielded wiring?	#chk	1	Y	N	NA	36
W/P (1)	1	Is platform equipped with necessary curbs, gutters and drip pans properly piped to sumps?	#chk	1	Y	N	NA	40
P	2	Does sump automatically maintain oil at a level to prevent discharge into the Gulf waters, or has an alternate method been approved? (# of sumps).	#chk	1	Y	N	NA	335
P	4	Is operator not disposing of oil, oily solids or other harmful waste material into Gulf?	#chk	1	Y	N	NA	337
P(2)	16	Is sewage disposal system installed?	#chk	1	Y	N	NA	28
P(2)	17	Does effluent contain 50 PPM or less of BOD, 150 PPM or less of suspended solids, min. chlorine residual of 1.0 mg/liter after min. retention time of 15 min?	#chk	1	Y	N	NA	30
Is fusible material used in pneumatic lines at the following strategic locations?								
P(2)	141a	Well heads	#chk	1	Y	N	NA	
P(2)	141b	Prod vessels	#chk	1	Y	N	NA	
P(2)	141c	Pumps, engines, generators	#chk	1	Y	N	NA	
P(2)	141d	Other strategic locations	#chk	1	Y	N	NA	
Are remote shut-in controls quick opening and at the following strategic locations?								
P	129a	Helicopter deck	#chk	1	Y	N	NA	250
P	129b	Exit stairway	#chk	1	Y	N	NA	251
P	129c	On each boat landing	#chk	1	Y	N	NA	252
P	129d	Other strategic locations	#chk	1	Y	N	NA	253
P	150	Is the diagram for fire fighting and gas detection systems, and standard procedure for testing safety equipment posted in prominent place? (underline items which are NA).	#chk	3	Y	N	NA	266
Are fire extinguishers located in the following strategic locations?								
P	151a	Well	#chk	1	Y	N	NA	
P	151b	Production	#chk	1	Y	N	NA	
P	151c	Compressor	#chk	1	Y	N	NA	
P	151d	Generator	#chk	1	Y	N	NA	
P	151e	Pump	#chk	1	Y	N	NA	
P	151f	Living Quarters	#chk	1	Y	N	NA	
P	151g	Other	#chk	1	Y	N	NA	
P	153a	Firewater system of rigid pipe or chemical system in production handling area?	#chk	1	Y	N	NA	271
P	153b	If chemical system is used in lieu of water system, has approval been granted?	#chk	1	Y	N	NA	407
P	154	Is there an alternate fuel or power source to provide continued firewater system pump operation or alternate firefighting system?	#chk	1	Y	N	NA	272
W	155	Are firewater system pumps tested weekly and test records maintained in field?	#chk	1	Y	N	NA	273
P	158	Is a continuous monitoring gas detection system located in enclosed area containing gas handling facilities or equipment? (# of such areas)	#chk	1	Y	N	NA	278
P	160	Does gas detection system sound alarm below lower explosive limit of 1.3% and trigger shut-in sequences to operate emergency equipment when levels reach not more than 4.9% (4.9% of LEL)	#chk	1	Y	N	NA	280

PART II - PLATFORM PIPELINESDEPARTING

SIZE	PRODUCT	DEP TO	REC PROD FROM FAC YES/NO	O.P. RANGE PSI HI/LO	PIPELINE PRESS SENSORS			PIPELINE PUMP	
					HI SET PSI	LO SET PSI	SHUTS WELL YES/NO	HI SET PSI	LO SET PSI

INCOMING

SIZE	PRODUCT	INCOM FROM	DEL PROD TO FAC YES/NO	O.P. RANGE PSI HI/LO	AUTO S. I. VALVE			CHECK VALVE YES/NO
					OPER- ABLE YES/ NO	ACT BY PLAT AUTO SI SYS YES/NO	ACT BY IND REM SI SYS YES/NO	

BI - DIRECTIONAL

SIZE	PROD- UCT	INCOM FROM	DEP TO	DEL PROD TO FAC YES/NO	REC PROD FROM FAC YES/ NO	O.P. RANGE PSI HI/LO	PRESS SENSOR				AUTO S.I. VALVE	
							HI SET PSI	LO SET PSI	SHUTS WELL YES/NO	OPER- ABLE YES/ NO	ACT BY PLAT AUTO SI SYS YES/NO	ACT BY IND REM SI SYS YES/NO

ENF. ACT.	INC. NO.	POTENTIAL INCIDENT OF NON-COMPLIANCE							COD. NO.
ARE DEPARTING PIPELINES EQUIPPED WITH:									
PL	123a	Operable high and low pressure sensor? (not less than two (x) # departing lines).	#chk:	Y	N	NA		298	
PL	123b	High and low pressure sensors designed to S.I. wells if production received from platform? (not less than two (x) # departing lines receiving production from platform).	#chk:	Y	N	NA		423	
PL	127a	Are pipeline pumps equipped with operable hi-lo pressure sensors? (two (x) # of pumps).	#chk:	Y	N	NA		326	
ARE INCOMING PIPELINES EQUIPPED WITH:									
PL	124a	Operable automatic shut-in valve actuated by platform automatic and remote shut-in system if production delivered to platform? (# incoming lines delivering production).	#chk:	Y	N	NA		400	
PL	124b	Operable automatic shut-in valve actuated by platform or independent remote shut-in system if production not delivered to platform? (# incoming lines not delivering production).	#chk:	Y	N	NA		408	
PL	124c	Check valve? (# incoming lines).	#chk:	Y	N	NA		409	
ARE BI-DIRECTIONAL PIPELINES EQUIPPED WITH:									
PL	125a	Operable hi and low pressure sensors? (# bi-directional lines).	#chk:	Y	N	NA		410	
PL	125b	Hi and low pressure sensors designed to shut-in wells if production received from platform? (# bi-directional lines receiving production).	#chk:	Y	N	NA		411	
PL	125c	Operable automatic shut-in valve actuated by platform automatic and remote shut-in system if prod. delivered to platform? (# bi-directional lines delivering production).	#chk:	Y	N	NA		412	
PL	125d	Operable automatic shut-in valve actuated by platform or independent remote shut-in system if production not delivering to platform? (# bi-directional lines not delivering production).	#chk:	Y	N	NA		413	

PART IV - PRODUCTION VESSELS

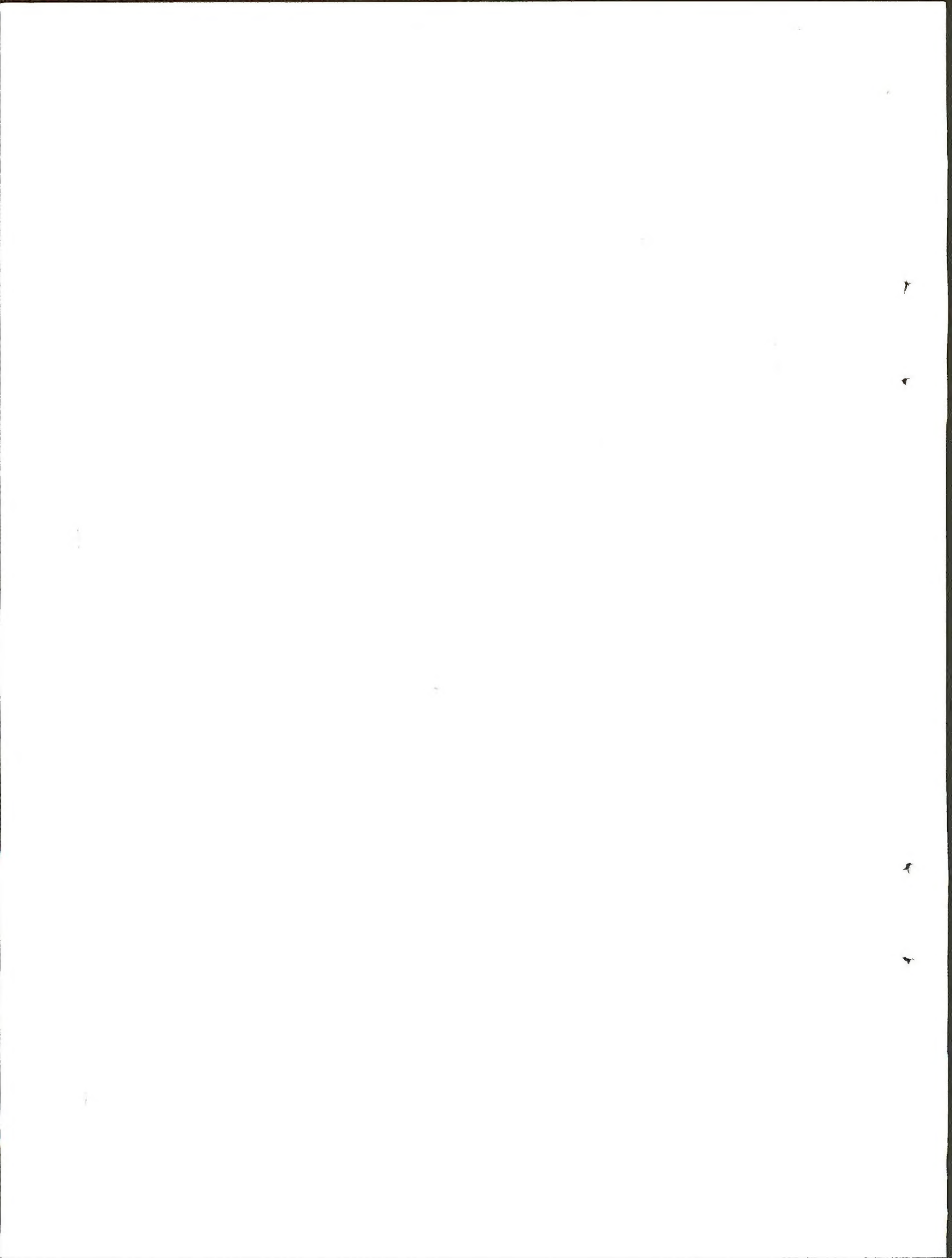
[illegible]

ENF. ACT.	INC. NO.	POTENTIAL INCIDENT OF NON-COMPLIANCE	C.D.E. NO.				
		Are pressure vessels equipped with:					
P(2)	110a	Operable high pressure sensor set no higher than 5% below working pressure (or 5 psi where applicable)?	#chk	Y	N	NA	414
P(2)	110b	Operable low pressure sensor set no lower than 10% below the lowest operating pressure (or 5 psi where applicable)?	#chk	Y	N	NA	415
P(2)	110c	Operable high-level shut-in?	#chk	Y	N	NA	416
P(2)	110d	Operable low-level shut-in?	#chk	Y	N	NA	417
P(2)	110e	Operable relief valves set no higher than vessel working pressure? (# of pressure operated vessels).	#chk	Y	N	NA	418
P(2)	114	Does inlet valve to separator and line from header to valve withstand SI wellhead pressure, if unprotected by relief valve?	#chk	Y	N	NA	205
P(2)	117	Is flareline equipped with scrubber?	#chk	Y	N	NA	206
P(2)	119	Are atmospheric vessels equipped with operable high-level shut-in controls? (includes flare scrubbers, stock, sump, and surge tanks, etc.).	#chk	Y	N	NA	385

* Applies only to separators with inlet valves

SUBSURFACE SAFETY DEVICES

ENF. ACT.	INC. NO.	POTENTIAL INCIDENT OF NON-COMPLIANCE	CODE NO.
E	192a	Is each tubing installation made after Dec. 1, 1972, equipped with a device activated by the platform shut-in or independent remote shut-in system if well has shut-in tubing pressure of less than 4,000 PSIG? (# such completions) (count approved subsurface controlled devices as NA).	419
E	192b	Is each tubing installation made after Dec. 1, 1972, equipped with a subsurface controlled device (or other approved device) if well has shut-in tubing pressure of 4,000 PSIG OR GREATER? (# such completions) (count approved surface controlled devices as NA).	422
W	102	Is operation of automatic wellhead valves tested weekly and results recorded and maintained in field? (# such zones not blind-flanged or plugged?	176
W	103	Is holding pressure of automatic wellhead valves tested monthly and results recorded and maintained in field? (# such zones not blind-flanged or plugged).	177
FIELD RECORDS			
W	10	Are spills and leaks properly reported and recorded and records available for inspection?	59
W	107	Are check valves tested monthly (or quarterly if applicable) and results recorded and maintained in field? (# zones not blind-flanged or plugged?	246
W	147	Are pressure sensors for zones and all pressurized vessels tested for proper settings monthly (or quarterly if applicable) and results recorded and maintained in field? (total sensors for zones and vessels).	237
F(2)	165	If produced water is discharged into the Gulf, are 4 samples taken during 24-hour period, once a month, and analyzed?	262
F(2)	162	Is the oil content of disposed waste water reduced to an average of not more than 50 PPM with a maximum of not more than 100 PPM? Date _____, Maximum PPM _____, Average PPM _____, Location sampling station _____.	259



ATTACHMENT J

EQUIPMENT AVAILABLE FOR EMERGENCY OIL
SPILL CONTROL AND CLEAN-UP IN THE
GULF OF MEXICO

(INFORMATION TAKEN FROM CLEAN GULF ASSOCIATES' OPERATIONS MANUAL)

OFFSHORE OPERATORS COMMITTEE
INVENTORY OF KNOWN RESOURCES AVAILABLE FOR
EMERGENCY OIL SPILL CONTROL & CLEANUP
MAY 1973

1. Spill Booms

A. Mississippi River Delta Area

<u>Operator</u>	<u>Type</u>	<u>Length</u>	<u>Location</u>
Amoco Production Company	3½" Fiberglass	310'	Bastian Bay
Chevron Oil Company	6" Slick Bar	200'	Cal-Ky Empire, La., Terminal
	T and T	500'	Cal-Ky Empire, La., Terminal
	6" Slick Bar	300'	Main Pass Block 69 Terminal
	D. R. Smart	200'	Cal-Ky Empire, La., Terminal
	D. R. Smart	400'	Main Pass Block 69
	T and T	485'	Romere Pass
	D. R. Smart	300'	Romere Pass
	6" Slick Bar	300'	Bay Coquille, #1 Battery
	D. R. Smart	600'	Bay Coquille, #1 Battery
	D. R. Smart	100'	Southwest Pass E-2
	6" Slick Bar	500'	Southwest Pass W-1
	D. R. Smart	150'	Southwest Pass W-1
	D. R. Smart	200'	Southwest Pass E-5
	6" Slick Bar	200'	Southwest Pass W-6
	D. R. Smart	150'	Southwest Pass W-6
	6" Slick Bar	200'	West Delta Terminal
	D. R. Smart	200'	Barataria
	D. R. Smart	200'	Delta Farms
	T and T	1,060'	Venice Base
	Johns-Manville	1,300'	Venice Base
	Kain	700'	Venice Base
	D. R. Smart	1,300'	Venice Base
	Navy Type	1,000'	Romere Pass
	Portable Floating		
	Saucer Pump Skimmer	1	Pascagoula Refinery

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EMERGENCY OIL SPILL CONTROL & CLEANUP
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1. Spill Boom

A. Mississippi River Delta Area (Cont'd)

<u>Operator</u>	<u>Type</u>	<u>Length</u>	<u>Location</u>
Chevron Oil Company	36" Uniroyal Boom	1,500'	Pascagoula Refinery
	36" Coastal TT Boom	500'	Pascagoula Refinery
	18" Uniroyal Boom	1,000'	Pascagoula Refinery
	Parker Systems Snare (1516)	25 boxes	Pascagoula Refinery
	Navy Type Boom Construction and Launching Assembly	1	Venice Base
	Boom Floats, Hose, Chain, Buoys, Etc.	Miscellaneous	Venice Base
Exxon Company, USA	Oil Boom	210'	Southeast Pass
	Uniroyal	200'	Potash
Gulf Oil Company - U.S.	36" Bennett (Inshore)	1000'	Venice
	D. R. Smart (Inshore)	200'	Bayou Couba Field
	D. R. Smart (Inshore)	300'	Grand Bay Field
	T. T. (Inshore)	1200'	Quarantine Bay
	Uniroyal (Inshore)	750'	West Bay Field
	Slick Bar (Inshore)	200'	Venice
	D. R. Smart (Inshore)	250'	Venice
	Slick Bar (Inshore)	400'	Ostrica Terminal
	D. R. Smart (Inshore)	180'	Ostrica Terminal

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1. Spill Boom

A. Mississippi River Delta Area (Cont'd)

<u>Operator</u>	<u>Type</u>	<u>Length</u>	<u>Location</u>
Placid Oil Company	Slick Bar	300'	Fort Sulphur
Shell Oil Company	Bennett	600'	Venice
	T-T	3200'	East Bay
	M-P	200'	Venice
	6" Slickbar	200'	Yacolskey Gas Plant
Texaco, Pipeline		2000'	Harvey
Texaco, Inc.		200'	Lafitte
		500'	
		500'	Lake Salvador
		200'	Pilot Town

B. Grand Isle-LaFourche-Terrebonne Area

<u>Operator</u>	<u>Type</u>	<u>Length</u>	<u>Location</u>
Amoco Production Company	3½" Fiberglass	480'	Lake Long Field
	3½" Fiberglass	400'	Bayou Des Allemands
	3½" Fiberglass	300'	Lake Raccourci Field
	3" Fiberglass	250'	Lake Bœuf Field

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1. Spill Booms

B. Grand Isle - LaFourche - Terrebonne Area (Cont'd)

<u>Operator</u>	<u>Type</u>	<u>Length</u>	<u>Location</u>
Chevron Oil Company	T and T	200'	Bayou Fourchon Terminal
	D. R. Smart	500'	Bayou Fourchon Terminal
	T And T	300'	Morgan City
	Sea Curtin	500'	Morgan City
Continental Oil Company New Orleans Division	6"	1100'	Grand Isle
Exxon Company, USA	8" Jatson	420'	Grand Isle
	8" Jatson	80'	Pelican Island
	6" Slickbar	250'	Benton Canal
Gulf Oil Company-U.S.	36" Coastal (Inshore)	600'	Timbalier Bay
	Slick Bar (Inshore)	200'	Bully Camp Field
	36" Bennett (Inshore)	1000'	Leeville
	Slick Bar (Inshore)	200'	Leeville
Mobil Oil Corporation	200' Floating Boom (6")		Clifton Ridge
	Trailer-Mounted		Tank Farm Lake Charles
Shell Oil Company	6" Slickbar	500'	Gibson Unit
		500'	Charvin Unit
Texaco, Inc.	6"	400'	Bay deChene
	Home Made	500'	Bay St. Elaine
	Slick Bar	500'	Caillou Island

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1. Spill Boom

B. Grand Isle-LaFourche-Terrebonne Area (Cont'd)

<u>Operator</u>	<u>Type</u>	<u>Length</u>	<u>Location</u>
Texaco, Inc.	6"	200'	Cecedric
		200'	Davant Terminal Convent
	Home Made	500'	Bag Lake
	6"	200'	Golden Meadow
	Home Made	500'	
	6"	2000'	Houma
	Home Made	500'	
	Home Made	500'	Lake Barre
		500'	Lake Pelto
	6"	200'	Levellie
	Home Made	500'	
	10" Home Made	250'	Plumb Bob

C. Morgan City-Atchafalaya Area

<u>Operator</u>	<u>Type</u>	<u>Length</u>	<u>Location</u>
Anoco Production Company	5" Float w/8" Skirt (Spill Trol)	300'	South Florence Field
Exxon Company, USA	6" Slickbar	650'	Avery Island
	6" Slickbar	200'	Weeks Island
	6" Slickbar	400'	Duck Lake
	Styrofoam	250'	Avery Island
	18" Uniroyal	350'	Bayou Sale
	36" Uniroyal	2000'	Baton Rouge Refinery
Kerr-McGee Corporation	TT 4'	1000'	Morgan City

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1. Spill Booms

C. Morgan City-Atchafalaya Area (Cont'd)

<u>Operator</u>	<u>Type</u>	<u>Length</u>	<u>Location</u>
Mobil Oil Corporation	(2) 40' boom for boat 6" x 18" apron	1036'	Morgan City
Phillips Petroleum Company	12" Sea-Curtain Boom	600'	Morgan City
Shell Oil Company	6" Slickbar	500' 300' 1700' 750'	Morgan City Weeks Island Weeks Lake Verret Unit Bayou Sorrel Unit
Tenneco	6"	300'	Cocodrie
Texaco Pipeline	6"	200'	Avery Island
	6"	300'	Baton Rouge
Texaco, Inc.	10" Home Made	200' 200' 50' 200'	Berwick Fausse Point Houseshoe Bayou Lake Mongonlois
Texaco Pipeline	6"	(2) 300'	Morgan City
Texaco, Inc.	6"	2,000'	New Iberia
	10" Home Made	100'	West Cote Blanche Bay
		500'	West Cote Blanche Bay
	3' Plastic, Nylon, Rubber	520'	West Cote Blanche Bay

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1. Spill Booms

C. Morgan City-Atchafalaya Area (Cont'd)

<u>Operator</u>	<u>Type</u>	<u>Length</u>	<u>Location</u>
Union Oil Co. of Calif.	6"	320'	East Lake Palourde

D. Vermilion-Cameron Area

<u>Operator</u>	<u>Type</u>	<u>Length</u>	<u>Location</u>
Amoco Production Company	6" x 10"	200'	Grand Chenier
	6" x 10"	1000'	Hackberry
Exxon Company, USA	6" Slickbar	250'	Pecan Island
Cities Service Oil Company	6"	2000'	Lake Charles
	12"	150' (3-50' sections)	Lawson Field-Crowley
Continental Oil Company	18" Uniroyal	360'	Gibbstown Barge Terminal
Shell Oil Company	6" Slickbar	650'	Black Bayou Unit

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1. Spill Booms

D. Vermilion-Atchafalaya Area (Cont'd)

<u>Operator</u>	<u>Type</u>	<u>Length</u>	<u>Location</u>
Texaco, Inc.	10" Home Made	150'	East Hackberry

E. Texas Coast Area

<u>Operator</u>	<u>Type</u>	<u>Length</u>	<u>Location</u>
American Oil Company	6"	2450'	Texas City
Atlantic-Richfield	6"	200'	Aransas Pass
Atlantic Pipeline	6"	100'	Longview
Chevron Oil Company	T and T	200'	Sabine Terminal
	D. R. Smart	500'	Sabine Terminal
	T and T	500'	Padre Island (Rockport,
	D. R. Smart	500'	Cedar Point (Gal. Bay)
Exxon Company, USA	18" Uniroyal	1500'	Baytown Refinery
	36" Uniroyal	1200'	Baytown Refinery
Gulf Oil Company- U.S.	18" Uniroyal (Inshore)	320'	Goose Creek

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1. Spill Booms

E. Texas Area (Cont'd)

<u>Operator</u>	<u>Type</u>	<u>Length</u>	<u>Location</u>
Shell Oil Company	None		
Sun Oil Company	18" Uniroyal	700'	Sour Lake
	18" Uniroyal	1000'	Nederland
	6" Slick Bar	400'	Nederland
	36" Bennett	2000'	Beaumont (In Stock)
	18" Bennett	2000'	Beaumont (In Stock)
	6" Slick Bar	3000'	Houston
Texaco, Inc.	6"	(2)100'	Orange
		500'	Galena Park
		500'	Port Arthur
		500'	Port Neches
		200'	Houston
Texaco Pipeline			

2. Skimmers & Vacuum Equipment

A. Mississippi River Delta Area

<u>Operator</u>	<u>Skimmers</u>	<u>Type</u>	<u>Location</u>
Amoco Production Company		36" x 44" Floating Skimmer	Lake Long Field
Chevron Oil Company	1	36" Floating	Barataria

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2. Skimmers & Vacuum Equipment

A. Mississippi River Delta Area (Cont'd)

<u>Operator</u>	<u>Skimmers</u>	<u>Type</u>	<u>Location</u>
Chevron Oil Company	**3	Shell	Venice Base
	1	Barge Mounting	Venice Base
	1	36" Floating	Romero Pass
	*11	AK	Venice Base
	2	35 BBL Capacity Vacuum Trucks Complete w/Skimmers	Pascagoula Refinery
Exxon Company, USA	(2)	2" Saucer Skimmer Pump	Southeast Pass
		3 $\frac{1}{2}$ " Saucer Skimmer Pump	Harvey
		2" Saucer Skimmer Pump	Lake Washington
		3 $\frac{1}{2}$ " Saucer Skimmer Pump	Potash
Gulf Oil Company-U.S.		Acme (Saucer) Skimmer	Bayou Couba Field
		Water Master Skimmer	Grand Bay Field
		Swiss-type Skimmer	Quarantine Bay
		Self-propelled Skimmer Barge	Quarantine Bay
		Water Master Skimmer	West Bay Field
		Water Master Skimmer	Venice
		Acme (Saucer) Skimmer	Venice
	Acme (Saucer) Skimmer	Ostrica Terminal	
Phillips Petroleum Company		Float Skimmer Model 3SK-FS	Buras
		Capacity 200 GPM	

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2. Skimmers & Vacuum Equipment

A. Mississippi River Delta Area (Cont'd)

<u>Operator</u>	<u>Type</u>	<u>Location</u>
Shell Oil Company	(1) Shell Oil Scoop (1) 24" Swiss Olea 111 Skimmer Skimmer Pump 700 GPM Portable Cent Sump Pump (100 PSIG Air) 300 GPM	Venice Venice East Bay Yscloskey Plant
Texaco, Inc.	Floating Skimmer (3HP) (2) Floating Skimmer (3HP) suction unit (3HP)	Garden Island Bay Lafitte Pilot Town

B. Grand Isle-LaFourche-Terrebonne Area

<u>Operator</u>	<u>Type</u>	<u>Location</u>
Chevron Oil Company	Don Wilson AK	Bay Marchand Bayou Fourchone Terminal
Continental Oil Company New Orleans Division	Skid-Deutz Vacuum Pump (15HP) Diesel-Diaphragm Pump (5HP)	Grand Isle

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2. Skimmers & Vacuum Equipment

B. Grand Isle-LaFourche-Terrebonne (Cont'd)

<u>Operator</u>	<u>Type</u>	<u>Location</u>
Exxon Company, USA	3½" Saucer Skimmer Pump Acme 400 Sk. Acme 400 Sk.	Thibodaux Grand Isle Pelican Isle
Gulf Oil Company-U.S.	Parker Oil Hawg Acme Tunnel Skimmer Acme (Saucer) Skimmer	Timbalier Bay Bully Camp Field Leeville
Shell Oil Company	(2) Acme FS-3 Portable 3 x 3 Cent Pump (5 HP Gas) Portable 3 x 3 Cent Pump (5 HP Gas)	Chauving & Gibser Iapice St. Gabriel
Texaco, Inc.	Float Skimmer (3 HP) Float Skimmer (3 HP) Cent. Pump (9 HP) 200 GM Cent. Pump (9 HP) 200 GM Suction Unit (3 HP) Cent. Pump (2 HP) 60 GPM Section Unit 3 HP Cent. Pump (9 HP) 200 GPM Cent. Pump (2 HP) 60 GPM (4) Suction Units (3 HP) (2) Float Skimmer (3 HP) Cent. Pump (2 HP) 60 GPM Float Skimmer (1 ½ HP)	Bay deChene Bay St. Elaine Caillou Island Cocodrie Davant Terminal Dog Lake Houma

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2. Skimmers & Vacuum Equipment

C. Morgan City - Atchafalaya Area

<u>Operator</u>	<u>Type</u>	<u>Location</u>
Chevron Oil Company	2 AK	Morgan City
Exxon Company, USA	Skimmer Pump w/26" Float	Bayou Sale
	Skimmer Pump (Floating)	Morgan City
	Skimmer Pump w/26" Float	Avery Island
	Skimmer Pump w/26" Float	Duck Lake
Shell Oil Company	(2) Portable Vacuum Pump (3 HP Gas)	Bayou Sorrel Un
	Float Skimmer Model 3SK-FS	Weeks Island Un
	Float Skimmer (3 HP)	West Lake Verre
	Portable Center Pump	
Texaco, Inc.	Suction Unit (3 HP)	Lafayette
	Float Skimmer suction unit (3 HP)	New Iberia
	Suction Unit (3 HP)	
	Float Skimmer (3 HP)	West Cote Blanc
	Float Skimmer (1 1/2 HP)	
Union Oil Co. of California	(2) Float Skimmer (2 HP air) 120 GPM	East Lake Palov

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2. Skimmers & Vacuum Equipment

D. Vermilion-Cameron Area

<u>Operator</u>	<u>Type</u>	<u>Location</u>
Amoco Production Company	Acme Skimmer Pump w/4 HP Engine	Hackberry
Cities Service Oil Company	Floating Skimmer Pump Model FS400-ASK 4" Float Complete w/Gasoline engine 100' of 4" Acme Nylon Hose w/couplings, elbows & floats	Lawson Field-Crowley
Phillips Petroleum Company	Float Skimmer Model 3SK-FS 200 GPM	Abbeville
Shell Oil Company	(2) Float Skimmer Model 3SK-FS Portable Vacuum Pump (3 HP)	Black Bayou Unit

E. Texas Gulf Coast Area

<u>Operator</u>	<u>Type</u>	<u>Location</u>
Chevron Oil Company	2 AK 1 Floating 1 Floating	Padre Island (Rockport, Padre Island (Rockport, Cedar Poing

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2. Skimmers & Vacuum Pumps

E. Texas Gulf Coast Area (Cont'd)

<u>Operator</u>	<u>Type</u>	<u>Location</u>
Exxon Company, USA	6 Skimmer Pumps-Air Driven	Baytown Refinery
Texaco, Inc.	(1) 4 HP Floating skimmer	Orange, Texas

3. Spraying Equipment

<u>Operator</u>	<u>Type</u>	<u>Capacity</u>	<u>Location</u>
Chevron Oil Company	1 Self-Elevating Boat (60' water depth) equipped with 700 GPM fire pumps and spray nozzle mounted on 46' crane boom.		Bay Marchand
	7 65'-85' Utility Vessels equipped with fire pumps and deck-mounted spray nozzles.		Bay Marchand
Exxon Company, USA	Trailer Mounted-Self Contained 2 Hale Pumps w/proportioning device 5" x 6" B. J. Pump 3" Trailer Mounted Pump	150 Gal. 200 GPM	Bayou Sale Grand Isle Breton Canal Morgan City

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3. Spraying Equipment (Cont'd)

<u>Operator</u>	<u>Type</u>	<u>Capacity</u>	<u>Location</u>
Mobil Oil Corporation	(5) Portable Hi Press Pumps & Guns "Huss" Helicopter Spray Unit	84 Gal.	Morgan City
Shell Oil Company	John Bean Spray Pump Hudson 32-B-1 Sprayer	150 Gal. 50 Gal.	Black Bayou Unit Good Hope Unit

4. Absorbents

<u>Type</u>	<u>Quantity</u>	<u>Location</u>	<u>Owner</u>
Hay	25 bales 50 bales 25 bales 20 bales	Lake Long Field Lake Raccourci Field Grand Chenier Hackberry	Amoco Production
Fibre Perl Sorbent	75 bags	Lawson Field-Crowley, La.	Cities Service O

In addition to the equipment of the Offshore Operators Committee, the Clean Gulf Associates also lease the following equipment from Halliburton Services:

- A. Fast Response Open Sea and Bay Skimmer System. Location:
1 @ Venice; 1 @ Intracoastal City.
- B. High Volume Open Sea Skimmer System. Location: Hoss barge,
Halliburton dock, Grand Isle.
- C. Shallow Water Skimmer System. Location. 1 @ Grand Isle.
Selection of a new model to be located at Venice is underway.
- D. Auxiliary Shallow Water Skimmers and Booms. Location:
Grand Isle (2 Parker oil Hawg skimmers; Bennet Flexiflo
Boom/100' section with skid). Venice (2 Swiss Olea III type
skimmers, Bennet Flexiflow Boom/100' section with skid).
Intracoastal City (1 Parker oil Hawg and 1 Swiss Olea III).
- E. Helicopter Underslung Spray System (HUSS). Location: Grand
Isle (one complete system); Venice (one complete system).
- F. Water Fowl Rehabilitation Units and Bird Scarers. Location:
Grand Isle (24 automatic scare away propane guns; 1 water
fowl rehabilitation unit). Venice (same as Grand Isle).
- G. Polyurethane Foam Generators and Pads. Location. Venice;
Grand Isle; Intracoastal City.

SB - 18
SVE - 10
SP - 22
H - 9
FWA - 48

SB - 28
SVE - 4
SP - 13
H - 8 MC
FWA - 0

SB	-	72	
SVE	-	14	91
SP	-	31	
H	-	17	MC
FWA	-	3	MC
		2	LF
		<u>5</u>	

SB	-	25	
SVE	-	39	
SP	-	30	
H	-	6	GI
		6	LV
		1	HM
		1	DL
		<u>14</u>	
FWA	-	1	LV
		4	HM
		<u>5</u>	

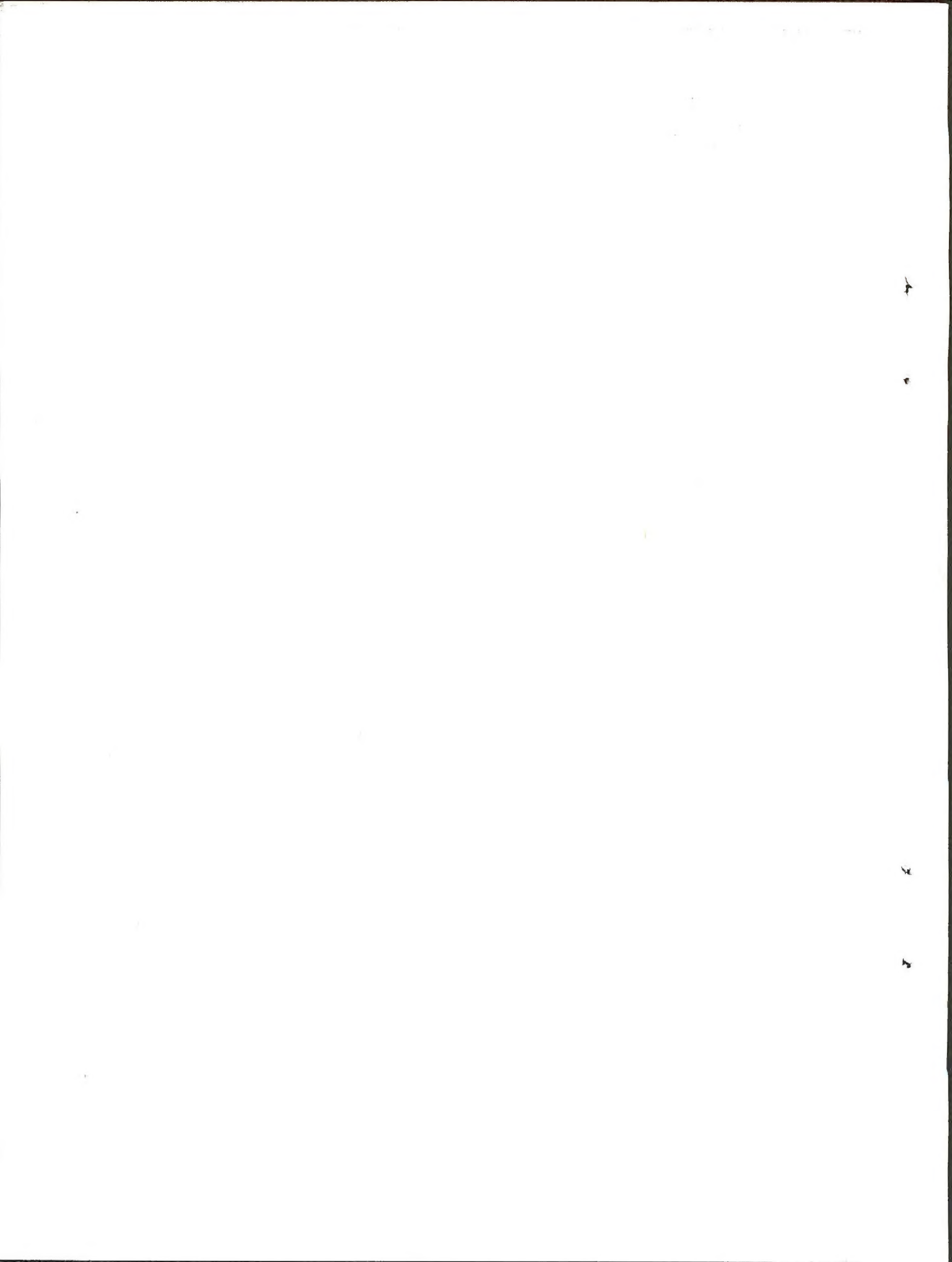
SB	-	34	→ 29
SVE	-	37	
SP	-	55	
H	-	8	VN
		5	EM
		2	TC
		1	NO
		<u>16</u>	
FWA	-	6	NO
		4	TC
		3	VN
		<u>13</u>	

MC - Morgan City
CM - Cameron
LF - Lafayette
GI - Grand Isle
LV - Leeville
HM - Houma
DL - Dulac
VN - Venice
EM - Empire
TC - Toca
NO - New Orleans

Spray Equipment - 20

SB - Service Boats
SVE - Skimmer & Vacuum Equip.
H - Helicopters
FWA - Fixed Wing Aircraft
SP - Spill Booms

50 100 150 MILES



ATTACHMENT K

SAMPLE OCS LEASE FORM

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

OIL AND GAS LEASE OF SUBMERGED LANDS
UNDER THE OUTER CONTINENTAL SHELF LANDS ACT

Office	
Serial Number	
Cash Bonus	
Rental Rate	
Minimum Royalty Rate	Royalty Rate

This lease is made and effective as of _____ (hereinafter called the Effective Date)
by and between the United States of America (hereinafter called the Lessor), by the
Bureau of Land Management, its authorized officer, and

(hereinafter called the Lessee). In consideration of the cash payment heretofore made by the Lessee to the Lessor and in consideration of the promises, terms, conditions and covenants contained herein, the parties hereto agree as follows:

Sec. 1. Statutes and Regulations. This lease is made pursuant to the Outer Continental Shelf Lands Act of August 7, 1953 (67 Stat. 462; 43 U.S.C. Secs. 1331, *et seq.*) (hereinafter called the Act). This lease is subject to all the provisions of the Act and to all the terms, conditions and requirements of the valid regulations promulgated by the Secretary of the Interior (hereinafter called the Secretary) thereunder in existence upon the effective date of this lease, all of which are incorporated herein and, by reference, made a part hereof. This lease shall also be subject to regulations hereafter issued by the Secretary pursuant to his authority under section 5(a)(1) of the Act to prescribe and amend at any time such rules and regulations as he may determine to be necessary and proper in order to provide for the prevention of waste and for the conservation of the natural resources of the Outer Continental Shelf, and for the protection of correlative rights therein, which regulations shall be deemed incorporated herein and, by reference, made a part hereof when promulgated.

Sec. 2. Rights of Lessee. The Lessor hereby grants and leases to the Lessee the exclusive right and privilege to drill for, mine, extract, remove and dispose of oil and gas deposits, except helium gas, in or under the following-described area of the Outer Continental Shelf of the United States:

containing approximately _____ acres (hereinafter referred to as the leased area), together with:

(a) the nonexclusive right to conduct within the leased area geological and geophysical explorations in accordance with applicable regulations;

(b) the nonexclusive right to drill water wells within the leased area and to use water produced therefrom for operations pursuant to the Act free of cost, provided that such drilling is conducted in accordance with procedures approved by the Regional Oil and Gas Supervisor of the Geological Survey (hereinafter called the "Supervisor"); and

(c) the right to construct or erect and to maintain within the leased area all artificial islands, platforms, fixed or floating structures, sea walls, docks, dredged channels and spaces, buildings, plants, telegraph or telephone lines and cables, pipelines, reservoirs, tanks, pumping stations, and other works and structures necessary to the full enjoyment of the rights granted by this lease, subject to compliance with applicable laws and regulations.

Sec. 3. Obligations of Lessee. The Lessee agrees:

(a) *Rentals and royalties* (1) To pay rentals and

royalties as follows:

Rentals. With respect to each lease year commencing prior to a discovery of oil or gas on the leased area, to pay the Lessor on or before the first day of each such year, a rental of _____ per acre or fraction thereof.

Minimum royalty. To pay the Lessor at the expiration of each lease year commencing after discovery a minimum royalty of _____ per acre or fraction thereof or, if there is production, the difference between the actual royalty required to be paid with respect to such lease year and the prescribed minimum royalty, if the actual royalty paid is less than the minimum royalty.

Royalty on production. To pay the Lessor a royalty of _____ percent in amount or value of production saved, removed, or sold from the leased area. Gas of all kinds (except helium and gas used for purposes of production from and operations upon the leased area or unavoidably lost) is subject to royalty.

(2) It is expressly agreed that the Secretary may establish minimum values for purposes of computing

royalty on products obtained from this lease, due consideration being given to the highest price paid for a part or for a majority of production of like quality in the same field, or area, to the price received by the Lessee, to posted prices, and to other relevant matters. Each such determination shall be made only after due notice to the Lessee and a reasonable opportunity has been afforded the Lessee to be heard.

(3) When paid in value, royalties on production shall be due and payable monthly on the last day of the month next following the month in which the production is obtained. When paid in production, such royalties shall be delivered at pipeline connections or in tanks provided by the Lessee. Such deliveries shall be made at reasonable times and intervals and, at the Lessor's option, shall be effected either (i) on or immediately adjacent to the leased area, without cost to the Lessor, or (ii) at a more convenient point closer to shore or on shore, in which event the Lessee shall be entitled to reimbursement for the reasonable cost of transporting the royalty substance to such delivery point. The Lessee shall not be required to provide storage for royalty taken in kind in excess of tankage required when royalty is paid in value. When payments are made in production the Lessee shall not be held liable for the loss or destruction of royalty oil or other liquid products in storage from causes over which the Lessee has no control.

(b) *Bonds* To maintain at all times the bond required prior to the issuance of this lease and to furnish such additional security as may be required by the Lessor if, after operations or production have begun, the Lessor deems such additional security to be necessary.

(c) *Wells.* (1) To diligently drill and produce such wells as are necessary to protect the Lessor from loss by reason of production on other properties or, in lieu thereof, with the consent of the Supervisor, to pay a sum determined by the Supervisor as adequate to compensate the Lessor for failure to drill and produce any such well. In the event that this lease is not being maintained in force by other production of oil or gas in paying quantities or by other approved drilling or reworking operations, such payments shall be considered as the equivalent of production in paying quantities for all purposes of this lease.

(2) After due notice in writing, to diligently drill and produce such other wells as the Secretary may reasonably require in order that the leased area or any part thereof may be properly and timely developed and produced in accordance with good operating practice.

(3) At the election of the Lessee, to drill and produce other wells in conformity with any system of well spacing or production allotments affecting the area, field, or pool in which the leased area or any part thereof is situated, which is authorized or sanctioned by applicable law or by the Secretary.

(d) *Payments.* To make all payments to the Lessor by check, bank draft or money order payable as indicated herein unless otherwise provided by regulations or by direction of the Secretary. Rental, royalties, and other payments shall be made payable to the United States Geological Survey and tendered to the Supervisor, except that filing charges, bonuses, and first year's rental shall be made payable to the Bureau of Land Management and remitted to the Manager of the appropriate field office of that Bureau.

(e) *Inspection.* To keep open at all reasonable times for the inspection of any duly authorized representative of the Lessor, the leased area and all wells, improvements, machinery and fixtures thereon and all books, accounts, and records relative to operations and surveys or investigations on or with regard to the leased area or under the lease.

(f) *Conduct of operations.* To conduct all operations under this lease in accordance with applicable law and regulations.

(g) *Indemnification* To indemnify and save the Lessor harmless against and from any and all claims of any nature whatever, including without limitation claims for loss or damage to property or injury to persons, caused by, or resulting from, any operation on the leased area conducted by or on behalf of the Lessee; provided that the Lessee shall not be held responsible to the Lessor under this subsection for any loss, damage, or injury caused by, or resulting from: (1) any negligent action of the Lessor other than the exercise or performance of (or the failure to exercise or perform) a discretionary function or duty on the part of a Federal agency or an employee of such an agency, whether or not the discretion involved is abused; or (2) the Lessee's compliance with an order or directive of the Lessor against which an appeal by the Lessee under 30 CFR 250.81 is filed before the cause of action for such a claim arises and is pursued diligently thereafter.

(h) *Equal Opportunity Clause.* The Lessee agrees that, during the performance of this lease:

(1) The Lessee will not discriminate against any employee or applicant for employment because of race, color, religion, sex or national origin. The Lessee will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Lessee agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Lessor setting forth the provisions of this Equal Opportunity clause.

(2) The Lessee will, in all solicitations or advertisements for employees placed by or on behalf of the Lessee, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex or national origin.

(3) The Lessee will send to each labor union or representative of workers with which Lessee has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the Lessor, advising the labor union or workers' representative of the Lessee's commitments under this Equal Opportunity clause, and shall post copies of the notice in conspicuous places available to employees, and applicants for employment.

(4) The Lessee will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(5) The Lessee will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, as amended, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the Secretary of the Interior and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(6) In the event of the Lessee's noncompliance with the Equal Opportunity clause of this lease or with any of said rules, regulations, or orders, this lease may be canceled, terminated or suspended in whole or in part and the Lessee may be declared ineligible for further Federal government contracts or leases in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, as amended, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, as amended, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(7) The Lessee will include the provisions of Paragraphs (1) through (7) of this subsection 3(h) in

every contract, subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order No. 11246 of September 24, 1965, as amended, so that such provisions will be binding upon each contractor, subcontractor or vendor. The Lessee will take such action with respect to any contract, subcontract or purchase order as the Secretary may direct as a means of enforcing such provisions including sanctions for noncompliance; *provided, however*, that in the event the Lessee becomes involved in, or is threatened with, litigation with a contractor, subcontractor or vendor as a result of such direction by the Secretary, the Lessee may request the Lessor to enter into such litigation to protect the interests of the Lessor.

(i) *Certification of nonsegregated facilities.* By entering into this lease, the Lessee certifies that Lessee does not and will not maintain or provide for Lessee's employees any segregated facilities at any of Lessee's establishments, and that Lessee does not and will not permit Lessee's employees to perform their services at any location, under Lessee's control, where segregated facilities are maintained. The Lessee agrees that a breach of this certification is a violation of the Equal Opportunity clause in this lease. As used in this certification, the term "segregated facilities" means, but is not limited to, any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin, because of habit, local custom, or otherwise. Lessee further agrees that (except where Lessee has obtained identical certifications from proposed contractors and subcontractors for specific time periods) Lessee will obtain identical certifications from proposed contractors and subcontractors prior to the award of contracts or subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause; that Lessee will retain such certifications in Lessee's files; and that Lessee will forward the following notice to such proposed contractors and subcontractors (except where the proposed contractor or subcontractor has submitted identical certifications for specific time periods): Notice to prospective contractors and subcontractors of requirement for certification of nonsegregated facilities. A Certification of Nonsegregated Facilities, as required by the May 9, 1967, order (32 F.R. 7439, May 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to the award of a contract or subcontract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each contract and subcontract or for all contracts and subcontracts during a period (i.e., quarterly, semiannually, or annually).

(j) *Assignment of lease.* To file for approval with the appropriate office of the Bureau of Land Management any instrument of transfer of this lease, or any interest therein, required to be filed under applicable regulations, within the time and in the manner prescribed by the applicable regulations.

Sec. 4. Term. This lease shall continue for a period of 5 years from the effective date of this lease and so long thereafter as oil or gas may be produced from the leased area in paying quantities, or drilling or well reworking operations, as approved by the Secretary, are conducted thereon.

Sec. 5. Cooperative or Unit Plan. Lessee agrees that, within 30 days after demand by Lessor, Lessee will subscribe to and operate under such cooperative or unit plan for the development and operation of the area, field,

or pool, or part thereof, embracing lands subject to this lease as the Secretary may determine to be practicable and necessary or advisable in the interest of conservation. Where any provision of a cooperative or unit plan of development which has been approved by the Secretary, and which by its terms affects the leased area or any part thereof, is inconsistent with a provision of this lease, the provision of such cooperative or unit plan shall govern.

Sec. 6. Reservations to Lessor. All rights in the leased area not expressly granted to the Lessee by the Act, the regulations, or this lease are hereby reserved to the Lessor. Without limiting the generality of the foregoing, such reserved rights include:

(a) *Geological and geophysical exploration; rights-of-way.* The right to authorize the conduct of geological and geophysical exploration in the leased area which does not interfere with or endanger actual operations under this lease, and the right to grant such easements or rights-of-way upon, through, or in the leased area as may be necessary or appropriate to the working of other lands or to the treatment and shipment of products thereof by or under authority of the United States, its Lessees or Permittees.

(b) *Leases of sulfur and other minerals.* The right to grant leases of any mineral other than oil and gas within the leased area or any part thereof. No lease of other mineral shall authorize or permit the Lessee thereunder unreasonably to interfere with or endanger operations under this lease.

(c) *Purchase of production.* In time of war, or when the President of the United States shall so prescribe, the right of first refusal to purchase at the market price all or any portion of the oil or gas produced from the leased area, as provided in Section 12(b) of the Act.

(d) *Taking of royalties.* The right to determine whether royalty will be taken in the amount or the value of production.

(e) *Helium.* Pursuant to Section 12(f) of the Act, the ownership of and the right to extract helium from all gas produced under this lease.

(f) *Suspension of operations during war or national emergency.* Upon recommendation of the Secretary of Defense, during a state of war or national emergency declared by the Congress or President of the United States after August 7, 1953, the authority of the Secretary to suspend any or all operations under this lease, as provided in Section 12(c) of the Act. *Provided*, That just compensation shall be paid by the Lessor to the Lessee.

(g) *Restriction of exploration and operations.* The right, as provided in Section 12(d) of the Act, to restrict from exploration and operations the leased area or any part thereof which may be designated by and through the Secretary of Defense, with the approval of the President, as, or as part of, an area of the Outer Continental Shelf needed for national defense; and so long as such designation remains in effect no exploration or operations may be conducted on the surface of the leased area or the part thereof included within the designation except with the concurrence of the Secretary of Defense; and if operations or production under this lease within any such restricted area shall be suspended, any payments of rentals and royalty prescribed by this lease likewise shall be suspended during such period of suspension of operations and production, and the term of this lease shall be extended by adding thereto any such suspension period, and the Lessor shall be liable to the Lessee for such compensation as is required to be paid under the Constitution of the United States.

Sec. 7. Directional Drilling. A directional well drilled under the leased area from a surface location on nearby land not covered by this lease shall be deemed to have the same effect for all purposes of this lease as a well drilled from a surface location on the leased area. In such circumstances, drilling shall be considered to have

been commenced on the leased area when drilling is commenced on the nearby land for the purpose of directionally drilling under the leased area, and production of oil or gas from the leased area through any directional well surfaced on nearby land or drilling or reworking of any such directional well shall be considered production or drilling or reworking operations (as the case may be) on the leased area for all purposes of this lease. Nothing contained in this paragraph is intended or shall be construed as granting to the Lessee any leasehold interests, licenses, easements, or other rights in or with respect to any such nearby land in addition to any such leasehold interests, licenses, easements, or other rights which the Lessee may have lawfully acquired under the Act or from the Lessor or others.

Sec. 8. Surrender of Lease. The Lessee may surrender this entire lease or any officially designated subdivision of the leased area by filing with the appropriate office of the Bureau of Land Management a written relinquishment, in triplicate, which shall be effective as of the date of filing. No surrender of this lease or of any portion of the leased area shall relieve the Lessee or his surety of the obligation to make payment of all accrued rentals and royalties or to abandon all wells on the area to be surrendered in a manner satisfactory to the Supervisor.

Sec. 9. Removal of property on termination of lease. Upon the termination of this lease in whole or in part, or the surrender of the lease in whole or in part, as herein provided, the Lessee shall within a period of 1 year thereafter remove from the premises no longer subject to the lease all structures, machinery, equipment, tools, and materials in accordance with applicable regulations and orders of the Supervisor; *provided, however,* that the Lessee may continue to maintain any such property on the leased area for whatever longer period it may be needed, as determined by the Supervisor, for producing wells or for drilling or producing on other leases.

Sec. 10. Remedies in case of default. (a) Whenever the Lessee fails to comply with any of the provisions of the Act, or of this lease, or of the regulations issued under the Act and in force and effect on the effective date of this lease, the lease shall be subject to can-

cellation in accordance with the provisions of Section 5(b) of the Act, *provided, however,* that the 30-day notice provision applicable to non-producing leases under Section 5(b)(1) of the Act shall also apply as a prerequisite to the institution of any legal action by the Lessor to cancel this lease while it is in a producing status. Nothing in this subsection shall be construed to apply to, or require any notice with respect to, any legal action instituted by the Lessor other than an action to cancel the lease pursuant to Section 5(b) of the Act.

(b) Whenever the Lessee fails to comply with any of the provisions of the Act, or of this lease, or of any regulations promulgated by the Secretary under the Act, the Lessor may exercise any legal or equitable remedy or remedies which the Lessor may have, including appropriate action under the penalty provisions of Section 5(a)(2) of the Act; *however,* the remedy of cancellation of the lease may be exercised only under the provisions of Section 5(b) and Section 8(i) of the Act.

(c) A waiver of any particular violation of the provisions of the Act, or of this lease, or of any regulations promulgated by the Secretary under the Act, shall not prevent the cancellation of this lease or the exercise of any other remedy or remedies under paragraphs (a) and (b) of this section by reason of any other such violation or for the same violation occurring at any other time.

Sec. 11. Heirs and successors in interest. Each obligation hereunder shall extend to and be binding upon, and every benefit hereof shall inure to, the heirs, executors, administrators, successors, or assigns, of the respective parties hereto.

Sec. 12. Unlawful interest. No member of, or Delegate to, Congress, or Resident Commissioner, after his election or appointment, or either before or after he has qualified, and during his continuance in office, and no officer, agent, or employee of the Department of the Interior, except as provided in 43 CFR 7.4(a)(1), shall be admitted to any share or part in this lease or derive any benefit that may arise therefrom; and the provisions of Section 3741 of the Revised Statutes (41 U.S.C. Sec. 22), as amended, and Sections 431, 432, and 433 of Title 18 of the United States Code, relating to contracts made or entered into, or accepted by or on behalf of the United States, form a part of this lease so far as the same may be applicable.

THE UNITED STATES OF AMERICA

(Signature of Lessee)

By _____
(Authorized Officer)

(Signature of Lessee)

(Title)

(Signature of Lessee)

(Date)

(Signature of Lessee)

If this lease is executed by a corporation, it must bear the corporate seal.

ATTACHMENT L

SUMMARY OF U.S. COAST GUARD REGULATIONS

ATTACHMENT L

Summary of U.S. Coast Guard Regulations Concerning Offshore Structures as Hazards to Navigation.

The pertinent regulations summarized below are found in the Code of Federal Regulations, No. 33, Navigation and Navigable Waters, Subpart 67.

The varied depths of water and marine commerce traffic routes which exist in the waters over the Outer Continental Shelf, and in other waters, permits the classification of structures according to their location in such waters. The structures in the area seaward of the line of demarcation specified by the Commandant and published in the Federal Register are designated as Class "A". This designation includes OCS platforms.

General requirements for lights specify that where structures have a horizontal dimension of over 50 feet on any one side or in diameter, an obstruction light shall be required on each corner or 90° apart in the case of circular structures. Each light is to have a 360° lens. Where 2 or more obstruction lights are required by the size of the structure, they must be in the same horizontal plane and not less than 20 feet above mean high water.

They shall be installed at a manner that will permit a mariner to hold sight of at least one of them until he is within 50 feet of the structure. Class "A" structure lights shall be white, powered

from a reliable power source and display a quick flash characteristic of approximately 60 flashes per minute. The lights shall be of sufficient candlepower as to be visible at a distance of 5 nautical miles 90% of the nights of the year and they shall be displayed at all times between sunrise and sunset, local time, commencing at the time construction of the structure is begun.

The fog signal shall have a frequency range above 100 cycles and a loudness level of 55 phons and shall be sounded every 20 seconds (sound 2 seconds, silent 18 seconds). For Class "A" structures this signal shall have an audible range of not less than 2 miles, with no wind, in all directions from the structure it marks, whenever visibility is less than 5 miles in any direction.

Changes in these rules may be permitted upon approval of the District Commander when warranted by circumstances such as proximity of structures.

ATTACHMENT M

Federal Register Notice Related to the Two-Tier Nomination
System.

Notices

This section of the FEDERAL REGISTER contains documents other than rules or proposed rules that are applicable to the public. Notices of hearings and investigations, committee meetings, agency decisions and rulings, delegations of authority, filing of petitions and applications and agency statements of organization and functions are examples of documents appearing in this section.

DEPARTMENT OF THE INTERIOR

Bureau of Land Management

POTENTIAL FUTURE OUTER CONTINENTAL SHELF OIL AND GAS LEASING

Request for Comments

In order to implement President Nixon's directive to lease ten million acres in 1975, and in order to implement more fully the purposes and objectives of the Outer Continental Shelf Lands Act, all concerned parties representing the oil and gas industry and the general public are invited and encouraged to submit information concerning areas of interest for offshore oil and gas leasing and to identify problem areas. This is being done in order to help ensure that scarce resources for exploration and development can be employed on the most promising areas consistent with environmental safeguards. Regulations or procedures necessary to implement the other actions announced by the President in his Energy Message relating to Outer Continental Shelf (OCS) leasing will be subsequently published for public comment before they become effective and are not part of this request for comment.

Oil and gas resources of the continental margin, including those beyond the 200 meter depth contour, subject to jurisdiction of the United States are to be considered. Precise continental shelf boundaries between the U.S. and opposite or adjacent states have not, with some exceptions, been agreed. Accordingly certain areas are or may be subject to dispute. No decision has been made to undertake leasing in actually or potentially disputed areas while efforts are being made to reach agreement with the nations concerned. In this connection reference is made to the last sentence of Department of State Public Notice 320, appearing in 35 FR 3301 of February 20, 1970.

Leasing in the Cook Inlet of Alaska and on the Atlantic OCS is contingent on resolution of the litigation between the Federal Government and the State of Alaska and Atlantic coastal states regarding areas of jurisdiction or an alternative resolution of the issues. Further, the President's Council on Environmental Quality is conducting studies of the environmental impact of oil and gas production on the continental shelf of the Atlantic Ocean and the Gulf of Alaska. No leasing in these areas will be permitted unless it is determined that oil and gas exploration and development can proceed in an environmentally satisfactory manner. However, information concerning OCS areas of interest is being

requested at this time in order to identify areas of special resource potential and of environmental value. It is the intention of the Department of Interior to conduct a call for tract nominations on more specific areas after consideration of the comments resulting from this request and, where appropriate, after resolution of State/Federal jurisdiction disputes

and a determination from the CEQ Atlantic and Gulf of Alaska studies that development can proceed in those areas in an environmentally satisfactory manner. Information received in response to this request will also be considered in determining future leasing plans.

The areas to be commented on are as follows:

Atlantic Coast OCS areas:

1. North Atlantic.....
2. Mid-Atlantic.....
3. South Atlantic.....

Gulf of Mexico OCS areas:

4. East Gulf.....
5. Central Gulf.....
6. West Gulf.....

Pacific OCS areas:

7. Southern California Borderland.....
8. Santa Barbara.....
9. North and Central California.....
10. Washington-Oregon.....

Alaska OCS areas:

11. Cook Inlet.....
12. Southern Aleutian Shelf.....
13. Gulf of Alaska.....
14. Bristol Bay.....
15. Bering Sea Shelf.....
16. Beaufort Sea.....
17. Chukchi Sea.....

* The line drawn from a point at: 43°19.9' N. latitude, 67°46.9' W. longitude, thence to 42°9.3' N. latitude, 67°40.0' W. longitude, thence 41°42.4' N. latitude, 67°28.8' W. longitude, and ending at 41°15.3' N. latitude, 66°58.9' W. longitude.

Other Areas of interest may be commented upon by appropriate area designation.

AREAS OF OIL AND GAS RESOURCE POTENTIAL

The following information is requested:

1. Rank by order of oil and gas potential the areas of interest listed above.

2. Outline of geologic structures of areas of interest shown on appropriate maps. All such information will remain confidential on request. Bureau of Land Management official leasing maps may be obtained from: (1) Gulf of Mexico Outer Continental Shelf Office, Suite 3300, The Plaza Tower, 1001 Howard Avenue, New Orleans, Louisiana 70113; (2) Pacific Outer Continental Shelf Office, 300 North Los Angeles Street, Los Angeles, California 90012; or, (3) Alaska

Approximate location
Bay of Fundy to Cape Cod north of 40° N. latitude and south of:
Cape Cod to Cape Hatteras between 40° N. to 35° N. latitude.
Cape Hatteras to Key West south of 35° N. latitude.

East of 88° W. longitude.
Between 88° W. to 93° W. longitude.
West of 93° W. longitude to Mexican border.

South of 34° N. latitude to Mexican border (except Santa Barbara Channel).
Santa Barbara Channel.
North of 34° N. latitude to California-Oregon border (except Santa Barbara Channel).
Between California-Oregon border and Canadian border.

South of 60° N. latitude.
West of 153° W. longitude.
North of 56° N. latitude, east of 153° W. longitude.
South of 58° N. latitude, east of 165° W. longitude.
U.S. waters south of 66° N. latitude.
Between 142° W. and 160° W. longitude.
U.S. waters north of 66° N. latitude, west of 160° W. longitude.

Outer Continental Shelf Office, 121 W. Firewood Lane, Room 270, P.O. Box 1159, Anchorage, Alaska 99510.

3. For each area of interest, estimated time periods required to achieve initial and peak production after a discovery is made, and identification of specific factors that may constrain development for these areas.

AREAS OF ENVIRONMENTAL CONCERN

The following information is requested:

1. Rank with areas of greatest environmental concern first the above areas and indicate specific environmental values which exist and damages which might be incurred.

2. If possible, indicate the location on maps of specific environmental features or hazards to be considered in these areas if their resource potential is devel-

oped (locations where maps can be obtained listed above).

3. Indicate specific actions which may be taken to reduce or eliminate potential conflicts with oil and gas exploration and development activities.

The information should be submitted no later than May 1, 1974, in envelopes or packets marked "Request for Comments on Potential Future, Outer Continental Shelf Oil and Gas Leasing." The information should be submitted to Director, Attention 730, Bureau of Land Management, Washington, D.C. 20240. Copies of the information should also be sent to the Chief, Conservation Division, No. 600, U.S. Geological Survey, National Center, Reston, Virginia 22092.

GEORGE C. TURCOTT,
*Associate Director,
Bureau of Land Management.*

Approved: February 15, 1974.

JOHN C. WHITAKER,
Acting Secretary of the Interior.

[FR Doc.74-4126 Filed 2-15-74;4:51 pm]

ATTACHMENT N

COMMENT OF SOLICITOR'S OFFICE, DEPARTMENT OF INTERIOR

ATTACHMENT N

Comment of Solicitor's Office, Department of Interior

The Geological Survey has suggested that because the Department is entering a new era of oil and gas development in the Gulf of Mexico by offering 12 tracts in water depths greater than 200 meters, it would be appropriate to include a discussion of the statutes or conventions which have a bearing upon the issuance of leases in such water depths and environmental protection in the same areas. The following discussion is intended to assist you in responding to this comment.

The provisions of the Outer Continental Shelf Lands Act, 67 Stat. 462, 43 U.S.C. §§ 1331-1343 (1970), are sufficiently flexible and discretionary to accommodate the terms and requirements of existing and future international conventions relating to the law of the sea and pollution of the seas. The Act provides that: (1) the Constitution and laws and civil and political jurisdiction of the United States are applicable to the subsoil and seabed of the OCS and to artificial islands and structures erected for the purpose of exploring for and extracting the natural resources therefrom, 43 U.S.C. § 1333(a)(1); (2) the Secretary may at any time prescribe and amend such rules and regulations which he determines are necessary to protect the natural resources of the Outer Continental Shelf, 43 U.S.C. § 1334(a)(1); and (3) the oil and gas leases

issued by the Secretary shall contain such terms and conditions not otherwise prescribed as the Secretary may establish when the leases are offered, 43 U.S.C. § 1337(b).

Treaties are the law of the land, U.S. Constitution, Article 6, and are made applicable to the subsoil and seabed of the Outer Continental Shelf by Section 1333(a)(1). The 1958 Convention on the High Seas which forbids unreasonable interference with such high sea freedoms as navigation, fishing, scientific research and the laying of submarine cables and pipelines recognizes as a reasonable use of the high seas the structures and devices necessary to explore for and extract the resources of the Outer Continental Shelf.

Likewise, the terms of any convention which may be agreed upon as the result of the International Law of the Sea negotiations currently in progress would be applicable to the OCS beyond the 200 meter depth contour. In particular, any pollution restrictions incorporated in an international treaty would be applicable and if not already encompassed in existing regulations for OCS operations, could be required pursuant to the Secretary's authority in Section 1334(a)(1). Such regulations would be applicable to existing leases as well as leases issued in the future.

Such application of treaty terms and regulatory changes to existing leases is assured by the terms of the leases themselves. The lease

is subject to the terms of the OCS Act, thereby incorporating existing and future treaties, Section 1333(a)(1), and to the terms of all valid regulations in existence upon the date of issuance of the lease or prescribed thereafter as necessary and proper in order to conserve the natural resources of the OCS.

Based upon a memorandum from the Solicitor to the Assistant Secretary - Energy and Minerals, June 22, 1973, (copy attached) the Department published a Notice in the Federal Register, 38 F.R. 30457, Nov. 5, 1973, (copy attached) which superseded language in the prior call for nominations for this sale, 38 F.R. 9839, April 20, 1973, which concerned the President's Oceans Policy Statement of May 23, 1970. The Notice superseding this language was published because the Department determined that the authority in the Outer Continental Shelf Lands Act was such that no additional language in OCS leases or new statutory authority would be necessary for leases issued beyond the 200 meter depth contour in order to comply with or accommodate existing international conventions, the President's Oceans Policy Statement, or the international negotiations currently in progress regarding the law of the sea.

Attachment 0

Common Names and Scientific Names for Marine Benthic Animals 1/

1/ From Collard, S. B. and C. N. D'Asaro, 1973. The biological environment--benthic invertebrates of the eastern Gulf of Mexico. p. III G-1 to III G-28. In. J. I. Jones, R. E. Ring, M. O. Rinkel, and R. E. Smith (ed.) A summary of knowledge of the eastern Gulf of Mexico. State Univ. Sys. Florida, Inst. Oceanog., St. Petersburg.

Phylum Porifera

SPONGES

<u>Axinella polycapella</u>	-
<u>Callyspongia vaginalis</u>	Pipe Organ Sponge
<u>Cliona caribboea</u>	Boring Sponge
<u>C. celata</u>	Boring Sponge
<u>C. vastifica</u>	Boring Sponge
<u>Dysidea fragilis</u>	-
<u>Geodia gibberosa</u>	-
<u>Hippiospongia lachne</u>	Bath Sponge
<u>Ircinia campana</u>	Vase Sponge
<u>I. fasciculata</u>	Garlic Sponge
<u>Microciona prolifera</u>	-
<u>Neopetrosia longleyi</u>	-
<u>Speciospongia vesparia</u>	Loggerhead Sponge
<u>Tedania ignis</u>	Fire Sponge

PHYLUM COELENTERATA

<u>Acanella eburnia</u>	Soft Coral
<u>Actinauge longicornis</u>	-
<u>Aiptasia pallida</u>	Anemone
<u>Astrangia solitaria</u>	Solitary Coral
<u>Bebryce grandis</u>	Soft Coral
<u>Bunodosoma cavernata</u>	Anemone
<u>Caligorgia verticillata</u>	Soft Coral
<u>Cerianthopsis americanus</u>	Cerianthid
<u>Chrysogorgia elegans</u>	Soft Coral
<u>Cladocarpus flexilis</u>	Hydroid
<u>Deltocyathus italicus</u>	Coral
<u>Desmophyllum cristagalli</u>	Coral
<u>Eudendrium carneum</u>	Hydroid
<u>Hydractinia echinata</u>	Hydroid
<u>Leptogorgia setacea</u>	Soft Coral
<u>L. virgulata</u>	Soft Coral
<u>Madrepora oculata</u>	Coral
<u>Millepora alcicornis</u>	Stinging Coral
<u>Muricea laxa</u>	Soft Coral
<u>M. pendula</u>	Soft Coral
<u>Oculina diffusa</u>	Coral
<u>Pennaria tiarella</u>	Hydroid
<u>Phyllangia americana</u>	Coral
<u>Renilla mulleri</u>	Sea Pansy
<u>Scirpearia grandis</u>	Soft Coral
<u>S. funiculina</u>	Soft Coral
<u>Scleracis guadalupensis</u>	Soft Coral
<u>Siderastraea siderea</u>	Coral
<u>Thesea grandiflora</u>	Soft Coral
<u>T. plana</u>	Soft Coral
<u>Trichogorgia viola</u>	Soft Coral
<u>Tubularia crocea</u>	Hydroid
<u>Villogorgia nigrescens</u>	Soft Coral

PHYLUM ANNELIDA

CLASS POLYCHAETA

SEGMENTED WORMS

<u>Amphitrite ornata</u>	-
<u>Arenicola cristata</u>	Lugworm

Axiothella mucosa
Branchioma nigromarginata
Chaetopterus variopedatus
Cistenides gouldii
Diopatra cupres
Hydroides hexagonus
Neanthes succinea
Onuphis magna
Polydora websteri

Bamboo Worm

-
-
-
-
-
-
-
-

PHYLUM MOLLUSCA

CLASS AMPHINEURA

Ischnochiton papillosus

Mesh-pitted Chiton

CLASS GASTROPODA

SNAILS

Anachis avara
A. obesa
Batillaria minima
Bittium varius
Bursatella leachi plei
Busycon spiratum
Caecum nitidum
C. pulchellum
Cantharus tinctus
Cassia madagascariensis
Cerithium floridanum
C. muscarum
C. variable
Conus stearnsi
C. sozoni
Crepidula convexa
C. fornicata
C. plana
Fasciolaria hunteria
F. tulipa
Ficus communis
Fusinus couei
Gaza superba
Haminoea antillarum
H. elegans
H. Succinea
Littorina angulifera
L. irrorota
L. ziczac
Melampus coffeus
M. bidentatus
Melongena corona
Mitrella lunata
Modulus modulus
Murex beaulti
M. florifer
M. fulvesceus
Nassarius vibex
Neritina reclinata
N. virginea
Odostomia impressa

Greedy Dove-shell
 Fat Dove-shell
 False Cerith
 Variable Bittium
 Ragged Sea-Hare
 Pear Whelk
 Little Horn Caecum
 -
 Tinted Cantharus
 Emperor Helmet
 Florida Cerith
 Fly-specked Cerith
 Dwarf Cerith
 Stearn's Cone
 Sozon's Cone
 Convex Slipper Shell
 Common Atlantic Slipper-shell
 Eastern White Slipper-shell
 Banded Tulip
 True Tulip
 Common Fig Shell
 Coue's Spindle
 Superb Gaza
 Antillean Paper-Bubble
 Paper-Bubble Shell
 Paper-Bubble Shell
 Augulate Periwinkle
 Marsh Periwinkle
 Zebra Periwinkle
 Salt Marsh Pulmonate
 Pulmonate
 Crown Conch
 Lunar Dove-shell
 Atlantic Modulus
 Beau's Murex
 Lace Murex
 Giant Eastern Murex
 Eastern Nassa
 Olive Nerite
 Virgin Nerite
 Impressed Odostome-

Oliva sayana
Petalocochnus irregularis
Phalium granulatum
Polinices duplicatus
Prunum apicinum
Retusa canaliculata
Scapella keineri
S. junonia
Sinum perspectivum
Strombus pugilis
Tegula fasciata
Terebra cinerea
Thais haenastoma floridana
Tonna galea
Turbo castaneus
Urosalpinx tampaensis

Lettered Olive
 Irregular Worm-Shell
 Scotch Bonnet
 Shark Eye
 Common Atlantic Marginella
 Channeled Barrel-Bubble
 Volute
 Junonia Volute
 Common Baby's Ear
 Fighting Conch
 Smooth Atlantic Tegula
 Gray Atlantic Auger
 Florida Rock Shell
 Giant Tun
 Chestnut Turban
 Tampa Drill

CLASS PELECYPODA

BIVALVES

Abra aequalis
Anadara simplex
Anodontia alba
Anomalocardia cuneimeris
Anomia simplex
Amygdalum papyria
Argopecten gibbus
A. irradians concentricus
Atrina serrata
Brachidontes exustus
B. recurvus
Cardiomya gemma
Cardita floridana
Chione cancellata
Codakia orbiculata
Congerina leucophaeta
Corbiculata contracta
Crassostrea virginica
Cryptopleura costata
Cyclinella tenuis
Dinocardium robustum
Diplodonta punctata
Donax variabilis
Dosinia discus
Echinochama cornuta
Isognomen alatus
Laevicardium mortoni
Lima pellucida
Lithophaga aristata
L. bisulcata
Macoma constricta
M. mitchelli
M. tageliformis
Macrocallista nimbosa
Mactra fragilis
M. cuneiformis
Martesia striata
Modiolus demissus
Mulinia lateralis
Nuculana acuta

Common Atlantic abra
 -
 Buttercup Lucina
 Pointed Venus
 Common Jingle Shell
 Paper Mussel
 Sea Scallop
 Atlantic Bay Scallop
 Saw-toothed Pen Shell
 Scorched Mussel
 Hooked Mussel
 Cuspidaria
 Broad-Ribbed Cardita
 Cross-Barred Venus
 Dwarf Tiger Lucina
 Conrad's False Mursel
 Contracted Corbula
 Eastern Oyster
 -
 Giant Atlantic Cockle
 Common Atlantic Diplodon
 Coquina Shell
 Disk Dosinia
 Florida Spiny Jewel Box
 Flat Tree Oyster
 Morton's Egg Cockle
 Antillean Lima
 Scissor Data Mussel
 Mahogany Data Mussel
 Constricted Macoma
 -
 Sunray Venus
 Fragile Atlantic Mactra
 Wedge-Shaded Wood Borer
 Striate Wood Borer
 Atlantic Ribbed Mussell
 -
 Nut Clam

N. concentrica
Ostrea equistris
O. frons
Pandora trilineata
Periploma fragile
Pinna carnea
Pitar cordata
Polymesoda caroliniana
Polystira albida
Rangia cuneata
Semele proficua
Spondylus americanus
Tagelus divisis
T. plebius
Tellina alternata
T. lineata
T. promera
T. similis
T. tampaensis
T. versicolor
Teredo navalis

Concentric Nut Clam
 Crested Oyster
 Coon Oyster
 Say's Pandora
 Fragile Spoon Clam
 Amber Pen Shell
 Schwengel's Venus
 Carolina Marsh Clam
 White Giant Turret
 Common Rangia
 White Atlantic Semele
 Atlantic Thorny Oyster
 Purplish Tagelus
 Stout Tagelus
 Alternate Tellin
 Rose Petal Tellin
 Promera Tellin
 Candy Stick Tellin
 Tampa Tellin
 DeKay's Dwarf Tellin
 Shipworm

PHYLUM ARTHROPODA

CLASS MEROSTOMATA

Limulus polyphemus

Horeshoe or King Crab

CLASS CRUSTACEA

SHRIMPS AND CRABS

Acanthocarpus alexandri
Alpheus heterochaelis
Aratus pisonii
Arenaeus cribrarius
Balanus amphitrite
B. declivis
B. eburneus
B. improvisus
Bathyplox typhla
Benthescymus cereus
B. bartletti
Calappa angusta
C. flammea
Callinassa islagrande
C. major
Cardisoma quahumi
Chiridotea caeca
Chthamalus fragilis
Clibanarius vittatus
Dromidia antillensis
Emerita talpoida
Eurypanopeus depressus
Gonodactylus townsendi
Haustorius sp
Hepatus epheliticus
Hymenopenaeus robustus
H. tropicalis
Iridopagurus dispar
Lepidopa benedicti
Ligyda baudiniana
L. exotica

-
 Big-Clawed Snapping Shrimp
 Mangrove Crab
 Beach Crab
 Barnacle
 -
 Ivory Barnacle
 Barnacle
 Deep Water Crab
 Deep Water Shrimp
 Deep Water Shrimp
 Deep Water Crab
 Flame Crab
 Ghost Shrimp
 Ghost Shrimp
 Land Crab
 Isopod
 Barnacle
 Hermit Crab
 Sponge Crab
 Beach Flea
 Mud Crab
 Mantis Shrimp
 Amphipod
 Crab
 Deep Water Shrimp
 Deep Water Shrimp
 Hermit Crab
 Mole Crab
 Isopod
 Isopod

<u>L. olfersii</u>	Isopod
<u>Lysiosquilla excavatrix</u>	Mantis Shrimp
<u>Macrobrachium ohione</u>	Fresh Water Shrimp
<u>Menippe mercenaria</u>	Stone Crab
<u>Mithrax spinosissimus</u>	Spider Crab
<u>Munida forceps</u>	Crab
<u>M. irrassa</u>	Crab
<u>Neopanope texana</u>	Mud Crab
<u>Ocypode albicans</u>	Beach Crab
<u>Orshestia grillus</u>	Beach Hopper
<u>Ovalipes quadulpenis</u>	Beach Crab
<u>Pachygrapsus transversus</u>	Crab
<u>Pagurus annulipes</u>	Hermit Crab
<u>P. bonairensis</u>	Hermit Crab
<u>P. longicarpus</u>	Hermit Crab
<u>Palaeonetes intermedius</u>	Shrimp
<u>P. pugio</u>	Shrimp
<u>P. vulgaris</u>	Shrimp
<u>Panulirus argus</u>	Spiny Lobster
<u>Persephona punctata</u>	Crab
<u>Petrochirus diogenes</u>	Hermit Crab
<u>Petrolisthes armatus</u>	Porcelain Crab
<u>P. galathinus</u>	Porcelain Crab
<u>Pilumnus sayi</u>	Crab
<u>Porcellana sigsbeiana</u>	Porcelain Crab
<u>Portunus gibbesii</u>	Swimming Crab
<u>P. spinicarpus</u>	Swimming Crab
<u>Procambarus alleni</u>	Swamp Crayfish
<u>P. blandingi</u>	White River Crayfish
<u>Pylopagurus corallinus</u>	Deep Water Hermit Crab
<u>Ranilia muricata</u>	Crab
<u>Raninoides constricta</u>	Crab
<u>Sesarma curacaoense</u>	Crab
<u>S. reticulatum</u>	Crab
<u>Solenocera vioscai</u>	-
<u>Stenorynchus seticornis</u>	Arrow Crab
<u>Talorchestia longicornis</u>	Beach Hopper
<u>Thor floridanus</u>	Shrimp
<u>Tozeuma carolinensis</u>	Bayonet Shrimp
<u>Uca minax</u>	Fiddler Crab
<u>U. pugilator</u>	Fiddler Crab
<u>U. pugnax</u>	Fiddler Crab
<u>U. rapax</u>	Fiddler Crab

PHYLUM ECHINODERMATA

CLASS ASTEROIDEA

STARFISH

<u>Astropecten articulatus</u>	Starfish
<u>Echinaster sentus</u>	Starfish
<u>Goniaster tessellatus</u>	Starfish
<u>Luidia clathrata</u>	Starfish
<u>Numphaster arenatus</u>	Starfish
<u>Plinthaster dentatus</u>	Starfish

CLASS ECHINOIDEA

SEA URCHINS

<u>Arbacia punctulata</u>	Sea Urchins
<u>Calocidaris micans</u>	Sea Urchins

<u>Clypeaster subdepressus</u>	Cake Urchin
<u>Encope michelini</u>	Large Sand Dollar
<u>Eucidaris tribuloides</u>	Slate Pencil Urchin
<u>Lytechinus variegatus</u>	-
<u>Mellita quinquiesperforata</u>	Small Sand Dollar
<u>Moira atropos</u>	Heart Urchin
<u>Plagiobrissus grandis</u>	Large Heart Urchin
<u>Stylocidaris assinis</u>	-

CLASS HOLOTHUROIDEA

<u>Holothuria floridana</u>	Sea Cucumbers
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CLASS OPHIUROIDEA

BRITTLE STARS

<u>Amphipolis gracillima</u>	Brittle Star
<u>Ophioderma brevispinum</u>	Brittle Star
<u>Ophioplehis elegans</u>	Brittle Star
<u>Ophiophragmus filigranus</u>	Brittle Star
<u>Ophiothrix angulata</u>	Brittle Star

MISCELLANEOUS PHyla

<u>Stylochus frontalis</u>	Flatworm (oyster worm)
<u>Cerebratulus lacteus</u>	Ribbon Worm
<u>Batillipes mirus</u>	Tardigrade
<u>Phoronis architecta</u>	-
<u>Dallina floridana</u>	Lamp Shell
<u>Cryptopora gnomon</u>	Lamp Shell
<u>Bugula sp.</u>	Bryozoan
<u>Membranipora sp.</u>	Bryozoan
<u>Zoobotryon verticillatum</u>	Bryozoan
<u>Styella partita</u>	Sea Squirt
<u>S. plicata</u>	Sea Squirt
<u>Molgula manhattensis</u>	Sea Squirt

ATTACHMENT P

Description and Charter

of

OCS RESEARCH ADVISORY BOARD

ATTACHMENT P

UNITED STATES
DEPARTMENT OF THE INTERIOR
Bureau of Land Management

OUTER CONTINENTAL SHELF RESEARCH ADVISORY BOARD

Establishment and Functions

This notice is issued in accordance with the provisions of 5 U.S.C. 552(a)(1), and section 9(a)(2) of the Federal Advisory Committee Act (Public Law 92-463). The Secretary of the Interior has established an Outer Continental Shelf Research Advisory Board after consultation with the Office of Management and Budget, in accordance with the provisions of the Federal Advisory Committee Act (Public Law 92-463). The Office of Management and Budget Committee Management Secretariat has authorized a 7-day period in lieu of the required 30-day period between Federal Register publication of the Board charter, and its filing as prescribed in Section 9(c) of Public Law 92-463. This Board will advise the Assistant Secretary - Land and Water Resources, the Director of the Bureau of Land Management, and other Departmental officers in matters related to environmental baseline and monitoring studies on the Federal Outer Continental Shelf lands. The Board charter is published in its entirety below. Further information regarding this document may be obtained from Mr. Frederick N. Ferguson, Assistant Solicitor - Minerals, Office of the Solicitor, U.S. Department of the Interior, Washington, D.C. 20240, telephone (202) 343-4325.

SIGNED, JOHN C. WHITAKER

Under Secretary of the Interior

Date: MAR 20 1974

CHARTER

OUTER CONTINENTAL SHELF RESEARCH MANAGEMENT ADVISORY BOARD

1. There is hereby established, pursuant to the provisions of the Federal Advisory Committee Act (5 U.S.C. 1970 ed., Supp. II, App. I), an Outer Continental Shelf Research Management Advisory Board. The Board will advise officers of the Department in the performance of discretionary functions of the Department under the Outer Continental Shelf Lands Act (43 U.S.C. §§ 1331-1343) in connection with baseline environmental data gathering and environmental monitoring on the Outer Continental Shelf (OCS). The functions of the Board are solely advisory.

2. The objective of the Board is to advise the Assistant Secretary-Land and Water Resources, the Director, Bureau of Land Management (BLM) and other officers of the Department, in the design and implementation of environmental research projects related to oil and gas exploration and development on the OCS. The objectives of the OCS program are: (1) orderly resource development, (2) protection of the environment, and (3) receipt of fair market value. This Board through its advisory efforts will assist the Bureau in meeting objectives (1) and (2). In order to fully realize its potential, it is anticipated that the Board will be required for the duration of OCS environmental baseline research and monitoring studies, a period of approximately ten years. The Board will, however, terminate on December 31, 1975, unless prior

to that date it is renewed for an additional period by the Secretary of the Interior, acting within his discretion and in accordance with the provisions of section 14(a)(2) of the Federal Advisory Committee Act, supra.

3. The Board will report directly to the Assistant Secretary-Land and Water Resources. (a) The Assistant Secretary-Land and Water Resources shall, after consultation with the Assistant Secretary-Energy and Minerals and the Assistant Secretary for Fish, Wildlife and Parks, appoint an employee of the Department of the Interior as Chairman for the Board. The Assistant Secretary-Land and Water Resources shall be responsible for assuring that the Board operates within statutory and Departmental requirements for the management of advisory committees. The Director, BLM, shall provide administrative support. (b) Each of the following Departmental bureaus shall appoint one member to the Board: the Geological Survey, and the Bureau of Sport Fisheries and Wildlife. The Administrator of the Environmental Protection Agency and the Administrator of the National Oceanic and Atmospheric Administration may each appoint one member. (c) At the invitation of the Secretary of the Interior, the Governor of each State off the coast of which OCS research projects are scheduled may nominate for appointment by the Secretary one member who shall represent that State on the Board. Initially the Governors of Mississippi, Alabama, and Florida will be asked to nominate Board

members. As OCS research projects expand into other geographic areas the Governors of the respective States involved may be invited to nominate members for appointment to the Board. (d) Each Federal member shall serve until his resignation, the termination of the Board, or his removal by the officer appointing him. If the agency appointing a member removes that member, it may appoint another in his place. Each non-Federal member shall be appointed to serve a one-year term, but may be re-appointed for additional one-year periods if the OCS area seaward of his State is still under active research.

4. (a) Subject to the limitations imposed by this Charter, the Board may establish its own procedures for the conduct of business. To facilitate the performance of the Board's functions, the Chairman may establish committees composed of members of the Board. Most scheduled meetings will be of specific committees, but the Chairman will have the latitude to invite any individual State member to any committee meeting. (b) The Board shall prepare an annual report to the Secretary on the status of ongoing environmental OCS research. This report will be made available to the public.

5. The Chief Scientist for the BLM OCS environmental research program or a person designated by him will attend all Board and committee meetings and will assist the Chairman wherever possible.

6. The Board will meet at the call of the Chairman, who shall give at least fifteen day's notice in writing. The Board is expected to meet at least bi-annually. Meetings will be conducted in accordance with statutory and Departmental requirements for advisory committees as prescribed in 308 DM 2 of the Department of the Interior Manual. The estimated total annual operating costs of the Board are \$10,000 and one man year of staff support.

7. The formation of this committee is determined to be in the public interest in connection with the performance of duties of this Department pursuant to statute as stated in paragraph 1 above. This Charter shall become effective April 1, 1974.

SIGNED, JOHN C. WHITAKER

Under Secretary of the Interior

Date: MAR 20 1974

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DENVER, CO 80225

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Library
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